This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

TX 511.1 .P956 BK.5
Prince, John Tilden,
Arithmetic by grades for inductive teach
Stanford University Libraries
3 6105 04927 2763

CTIVE SERIES

PRINCE

ARITHMETIC

BY

GRADES

DEPARTMENT OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

BOOK V.

Tx.
511.1
P956
bk. 5

GINN & COMPANY

25

PRESENTED BY THE PUBLISHERS

—TO THE—

TEXT-BOOK COLLECTION

—OF THE—

SCHOOL OF EDUCATION
LIBRARY

TEXTBOOK COLLECTION
GIFT OF
THE PUBLISHERS

STANFORD UNIVERSITY
LIBRARIES

PRESENTED TO Stanford LIBRARY
SAMPLE COPY
by GINN & CO., 325 Sansome St.,
S. F., CAL.

ARITHMETIC BY GRADES

FOR INDUCTIVE TEACHING, DRILLING AND TESTING

BOOK NUMBER FIVE

Common and Decimal Fractions, Mensuration, Denominate Numbers, Business Transactions

DEPARTMENT OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

PREPARED UNDER THE DIRECTION OF
JOHN T. PRINCE

BOSTON, U.S.A.
GINN & COMPANY, PUBLISHERS
1899

615016
C

COPYRIGHT, 1895
BY JOHN T. PRINCE

ALL RIGHTS RESERVED

NOTE TO TEACHERS.

THE attention of teachers is called to the following features of this series of books — features which should be kept in mind as the various subjects are presented.

1. The separation of teachers' and pupils' books, whereby pupils may be taught properly and may not be given too great assistance. Suggestions as to methods of teaching and drilling, as well as the illustrative processes, explanations, rules, and definitions which belong to the teacher to develop analytically are put into the Teachers' Manual, while in the pupils' books are presented only such exercises as are needed for practice.

2. The careful gradation of problems, by which pupils acquire inductively a knowledge of arithmetical relations and principles, and skill in arithmetical processes. This is in recognition of the well-known pedagogical principles of proceeding from the known to the unknown, and from the simple to the complex. It is advised that this plan be kept constantly in mind by the teacher, and that whenever a process is not understood or is not readily performed, the pupils should be taken back to processes which are well known and which can be performed readily, and then should be led forward by easy steps until the desired end is reached.

3. Frequent reviews, and such an arrangement of exercises as will enable pupils to have needed practice in the applications of each principle, first by itself, and afterwards in connection with other principles which have been learned.

4. The large amount of oral work, or work which may be done without the aid of figures. Three objects of Mental Arithmetic are sought in these exercises: (*a*) Illustration of principles and a preparation for written work, (*b*) Development of the logical powers, (*c*) Cultivation of ability to work with large numbers by short processes.

5. The great number and variety of problems. The aim has been to give the *largest number* of problems that will be needed for teaching and for drilling in all grades. For this reason, and because the forms of expression are varied, being taken from many sources, there will be no necessity of giving supplementary drill lessons on the blackboard. Blackboard lessons are objectionable not only on account of a waste of the teachers' time and strength, but also on account of the injury done to pupils' eyes in much reading and copying from the blackboard.

6. Practicalness of work in respect to the character of the problems, and the solution of them. Care has been taken to give problems which are most likely to be met in every-day life, and to give them in a practical form. Many of the miscellaneous review problems were made by mechanics, clerks, accountants, etc., with a view of presenting conditions most likely to occur.

7. The introduction of statistics and facts of physics, astronomy, history, geography, etc., thus enabling pupils to gain incidentally much useful information.

8. The use of drill tables and other devices to save the time of teachers.

In addition to the above features, some of which are distinctively new so far as American text-books are concerned, there is the separation of pupils' exercises for practice into small books somewhat on the lines of gradation in City graded schools. By this arrangement there are gained greater convenience of handling and economy of wear than in the use of a large book which is intended to be used for several years by the same pupil.

The first Section of this book is given to a review of some work included in Book No. 4. If it is found too difficult for pupils, a review with objects and by the development method should be made.

Operations with fractions previously carried to twelfths and thousandths are continued in Sections II, III and IV. If the previous work has been well done, little objective teaching will be found necessary beyond representations that may be made by drawings. Whenever any difficulty is met in performing these exercises, reference should be made to similar exercises with halves, thirds, tenths, hundredths, etc., using objects when neces-

sary. Mensuration also is continued in Section V, advancing to the measurement of all polygons and of rectangular solids. It is advised that so far as possible diagrams be drawn in illustration or explanation of problems. Teachers are reminded that constructive work with blocks is needed at this stage.

In addition to the graded and illustrative work indicated for the introduction of new measures, it will be advisable to teach such measures objectively.

In making out bills, receipts, cash accounts, etc., it will be better for pupils to draw the needed rulings, rather than to use blanks provided for the purpose.

For methods of teaching the various subjects and for answers to problems see Teachers' Manual which is designed to accompany all books of the series.

SECTION I.

Oral Review Exercises.

1. $42+23$; $67+22$; $31+65$; $44+35$; $52+34$.
2. $38+42$; $46+34$; $21+49$; $67+23$; $45+35$.
3. $25+16$; $38+18$; $49+16$; $37+19$; $24+18$.
4. $27+28$; $46+29$; $37+34$; $45+28$; $37+48$.
5. $39+46$; $48+39$; $52+29$; $68+32$; $48+39$.
6. $73+45$; $84+22$; $65+64$; $77+42$; $61+38$.
7. $84+26$; $76+44$; $65+45$; $98+42$; $73+67$.
8. $58+43$; $69+42$; $87+46$; $96+53$; $74+48$.
9. $124+35$; $132+45$; $163+37$; $148+23$; $183+54$.
10. $136+54$; $145+55$; $187+33$; $196+54$; $246+64$.
11. $244+39$; $276+45$; $375+67$; $237+45$; $193+49$.
12. $142+135$; $127+142$; $134+45$; $127+42$; $152+36$.
13. $236+144$; $242+128$; $276+124$; $338+152$; $274+136$.
14. $347+138$; $264+171$; $346+138$; $574+238$; $286+265$.
15. $275+238$; $346+265$; $427+384$; $527+365$; $278+368$.
16. From 100 take 20; 60; 35; 45; 75; 55; 15; 65; 25.
17. From 100 take 8; 18; 38; 48; 28; 58; 68; 88; 78.
18. From 100 take 3; 13; 43; 23; 63; 53; 73; 33; 83.
19. From 100 take 17; 16; 15; 13; 18; 19; 12; 11; 14.
20. From 100 take 27; 21; 23; 25; 28; 24; 26; 22; 29.
21. From 100 take 34; 43; 56; 28; 35; 48; 57; 61; 72.
22. $21-14$; $61-14$; $21-13$; $91-13$; $51-13$.
23. $23-16$; $83-16$; $43-16$; $23-18$; $63-18$.
24. $22-18$; $72-18$; $22-15$; $72-15$; $92-15$.
25. $22-19$; $62-19$; $82-19$; $24-19$; $84-19$.
26. $25-17$; $55-17$; $75-17$; $22-17$; $92-17$.
27. $35-28$; $65-28$; $95-38$; $75-48$; $85-58$.
28. $37-29$; $67-29$; $87-39$; $97-59$; $97-49$.
29. $42-36$; $52-26$; $82-46$; $92-56$; $92-36$.

1. Multiply each number from 10 to 20 by 3; by 6; by 4; by 8
2. Multiply each of the following numbers in order by 3:

20	40	30	60	80	70	50	90	60	40	80	50
10	14	20	26	40	48	30	37	50	57	90	96
30	38	50	59	20	29	80	86	70	75	40	48
47	65	36	74	66	89	95	69	59	78	69	98

3. Multiply each of the above by 8; by 6; by 9; by 7; by 5.
4. Multiply each of the above by 20; by 40; by 80; by 70.
5. Divide 39, 48, 42, 60, 45, 63, 72, 81, 75, 57, and 84 by 3.
6. Divide 52, 60, 72, 56, 64, 76, 68, 84, 92, 88, and 96 by 4.
7. Divide 70, 65, 85, 95, 80, 75, 100, 125, 140, and 115 by 5.
8. Divide 72, 84, 96, 90, 78, 108, 120, 102, 126, and 144 by 6.
9. Divide 98, 112, 105, 133, 137, 119, 140, 126, 147, and 161 by 7.
10. Divide 112, 124, 140, 116, 132, 156, 172, 148, 180, and 196 by 8.
11. Divide 117, 135, 153, 144, 180, 171, 162, 198, 225, and 207 by 9.
12. $\frac{1}{2}+\frac{1}{4}$; $\frac{3}{4}+1\frac{1}{2}$; $6\frac{3}{4}+\frac{1}{8}$; $3\frac{3}{4}+\frac{3}{8}$; $5\frac{1}{2}+2\frac{3}{4}$.
13. $3\frac{3}{4}+2\frac{5}{8}$; $4\frac{7}{8}+6\frac{3}{4}$; $2\frac{3}{4}+\frac{1}{8}$; $3\frac{5}{8}+4\frac{3}{4}$; $2\frac{5}{8}+3\frac{3}{8}$.
14. $4\frac{1}{3}+\frac{1}{6}$; $2\frac{2}{3}+\frac{5}{6}$; $2\frac{1}{6}+\frac{7}{12}$; $4\frac{3}{4}+\frac{7}{12}$; $2\frac{5}{6}+\frac{7}{12}$.
15. $4\frac{2}{5}+\frac{1}{5}$; $\frac{3}{5}+\frac{3}{5}$; $4\frac{2}{5}+\frac{7}{10}$; $3\frac{3}{5}+\frac{2}{5}$; $2\frac{2}{5}+1\frac{1}{2}$.
16. $4-\frac{2}{3}$; $\frac{3}{4}-\frac{1}{8}$; $\frac{7}{8}-\frac{3}{4}$; $4\frac{1}{4}-1\frac{1}{2}$; $3\frac{1}{2}-\frac{7}{8}$.
17. $2\frac{1}{4}-\frac{5}{8}$; $3\frac{1}{4}-\frac{1}{8}$; $1\frac{1}{2}-\frac{5}{8}$; $1\frac{3}{8}-\frac{7}{12}$; $3\frac{1}{12}-\frac{1}{2}$.
18. $7\frac{1}{3}-\frac{2}{3}$; $6\frac{1}{3}-\frac{5}{6}$; $4\frac{1}{12}-\frac{5}{6}$; $2\frac{1}{5}-\frac{9}{10}$; $4\frac{1}{8}-1\frac{3}{4}$.
19. $9\frac{1}{2}-1\frac{5}{6}$; $4\frac{1}{6}-1\frac{3}{4}$; $2\frac{1}{3}-\frac{2}{3}$; $4\frac{1}{10}-3\frac{4}{5}$; $7\frac{1}{4}-1\frac{11}{12}$.
20. $\frac{1}{2}\times 6$; $\frac{3}{4}\times 4$; $\frac{3}{4}\times 8$; $\frac{5}{6}\times 6$; $1\frac{1}{2}\times 6$.
21. $2\frac{1}{4}\times 3$; $3\frac{3}{4}\times 2$; $3\frac{1}{2}\times 7$; $2\frac{3}{4}\times 5$; $1\frac{5}{8}\times 4$.
22. $\frac{3}{4}\times\frac{1}{2}$; $\frac{1}{2}\times\frac{3}{5}$; $\frac{3}{4}\times\frac{3}{5}$; $1\frac{3}{8}\times 4$; $\frac{5}{8}\times\frac{1}{2}$.
23. $1\frac{1}{2}\times\frac{3}{4}$; $1\frac{2}{3}\times\frac{1}{2}$; $1\frac{2}{3}\times\frac{3}{4}$; $2\frac{1}{2}\times\frac{1}{3}$; $2\frac{5}{6}\times\frac{1}{2}$.
24. $1\frac{1}{2}\times 1\frac{1}{4}$; $1\frac{2}{3}\times 1\frac{1}{2}$; $4\frac{1}{3}\times 2\frac{1}{2}$; $2\frac{3}{4}\times 1\frac{2}{3}$; $4\frac{1}{2}\times 1\frac{5}{6}$.
25. $\frac{6}{8}\div 2$; $\frac{3}{4}\div 2$; $1\frac{1}{3}\div 3$; $1\frac{1}{2}\div 4$; $1\frac{2}{3}\div 4$.
26. $4\div\frac{1}{2}$; $6\div\frac{1}{3}$; $8\div\frac{3}{4}$; $4\div\frac{3}{4}$; $5\div\frac{5}{6}$.
27. $\frac{1}{4}\div\frac{1}{2}$; $\frac{3}{4}\div\frac{2}{3}$; $1\frac{2}{3}\div\frac{3}{4}$; $1\frac{1}{2}\div\frac{5}{8}$; $3\frac{1}{3}\div\frac{1}{4}$.
28. $2\frac{3}{4}\div\frac{3}{4}$; $3\frac{1}{3}\div\frac{3}{4}$; $4\frac{1}{2}\div\frac{5}{6}$; $6\frac{2}{3}\div 1\frac{1}{2}$; $3\frac{5}{12}\div 1\frac{5}{6}$.
29. $6\frac{2}{3}+1\frac{1}{4}-1\frac{1}{6}-\frac{3}{4}+1\frac{5}{8}-2\frac{1}{4}\times 2-3\frac{3}{4}-\frac{5}{6}+1\frac{1}{2}-1\frac{5}{12}+3\frac{1}{8}$.
30. $4\frac{1}{2}-3\frac{3}{4}+1\frac{2}{3}-\frac{5}{6}-\frac{1}{4}\times\frac{3}{4}\div\frac{3}{4}\times 2\frac{1}{2}\times 3-4\frac{5}{6}-1\frac{1}{3}-1\frac{1}{2}+2\frac{3}{4}$.

Find the cost of:

1. 4 lb. beef @ 18¢ and 3 lb. pork @ 15¢.
2. 6 lb. butter @ 40¢ and 4 lb. sugar @ 6¢.
3. 8 lb. coffee @ 30¢ and 2 bu. potatoes @ 60¢.
4. 12 lb. fish @ 8¢ and ½ bu. corn @ 90¢.
5. 3 bu. oats @ 35¢ and 2 bu. corn @ 90¢.
6. 6½ lb. rice @ 8¢ and 3½ doz. eggs @ 20¢.
7. 2½ lb. starch @ 16¢ and 15 lb. sugar @ 6¢.
8. 14 yd. calico @ 9¢ and 2 yd. shirting @ 16¢.
9. 3 yd. velvet @ $2.50 and 20 yd. ribbon @ $¼.
10. 9 lb. cheese @ 14¢ and 4 lb. butter @ 35¢.
11. 8 lb. honey @ 18¢ and 3 qt. oil @ 20¢ a gallon.
12. 9 qt. strawberries @ 16¢ and 5 qt. nuts @ 14¢.
13. 4½ doz. bananas @ 25¢ and ⅔ doz. oranges @ 40¢
14. 5 gal. kerosene @ 9¢ and 1½ lb. coffee @ 35¢.
15. How many cents in $¾? $⅓? $⅔? $⅛? $⅜? $⅛? $⅜? $⅝? $1½? $1½? $1½? $1½?
16. What will 18 yd. cloth cost at 33⅓¢ a yard?
17. What will 6 lb. sugar cost at 8⅓¢ a pound?
18. What will 8 lb. beef cost at 12½¢ a pound?
19. What will 15 lb. rice cost at 8⅓¢ a pound?
20. What will 4 yd. cloth cost at 37½¢ a yard?
21. What will 6 bu. potatoes cost at 75¢ a bushel?
22. What will 12 bu. corn cost at 66⅔¢ a bushel?
23. What will 8 bu. wheat cost at 87½¢ a bushel?
24. How many dozen eggs at 16⅔¢ a dozen will pay for 4 bu. corn at 87½¢ a bushel?
25. How many bushels potatoes at 62½¢ a bushel will pay for 4 yd. cloth at $1.12½ a yard?
26. Bought 10 bu. apples at 62½¢ a bushel, and paid for them with eggs at 37½¢ a dozen. How many dozen eggs did I give?
27. Bought 6⅔ lb. of beef at 15¢ a pound, and gave a dollar bill. What change?
28. Bought 9 lb. 12 oz. of cheese at 12¢ a pound, and gave a two-dollar bill. What change?

Give the change received for a five-dollar bill from the following purchases :

1. $8\frac{1}{2}$ lb. butter @ 30¢ and 2 lb. starch @ $12\frac{1}{2}$¢.
2. 3 gal. 1 qt. molasses @ 48¢ a gallon.
3. $12\frac{2}{3}$ lb. nails @ 9¢ and $6\frac{3}{4}$ lb. tacks @ 8¢.
4. 4 bu. corn @ 75¢ and 4 bu. oats @ $37\frac{1}{2}$¢.
5. $4\frac{3}{8}$ yd. cloth @ 40¢ and 2 yd. ribbon @ $\$\frac{3}{8}$.
6. 1 gross buttons @ $\frac{3}{4}$¢ apiece.
7. $5\frac{3}{4}$ doz. eggs @ 36¢ and $6\frac{1}{2}$ lb. sugar @ 7¢.
8. $1\frac{1}{2}$ bu. corn @ 80¢ and $2\frac{1}{3}$ bu. oats @ 32¢.
9. When wood is $\$7\frac{3}{4}$ a cord, how much must I pay for $\frac{1}{8}$ of a cord? for $1\frac{2}{3}$ cords?
10. How many bushels of potatoes at $\$\frac{5}{8}$ a bushel can I get for $5?
11. What will 6.4 yd. of cloth cost at 30¢ a yard?
12. How many feet are there in 4 rods? 10 rods?
13. How many yards around the walls of a room 12 ft. square? How many square yards in the floor?
14. How many rods of fence will be required to inclose a lot of land $6\frac{1}{2}$ rd. long, $4\frac{1}{2}$ rd. wide?
15. What will 5 cwt. of coal cost at $5 a ton? What will 150 lb. cost?
16. What will 4 lb. 4 oz. cheese cost at 16¢ a pound?
17. A piece of carpet 12 yd. long and $2\frac{1}{2}$ ft. wide contains how many square feet? how many square yards?
18. A sidewalk 3 rd. long and 6 ft. wide contains how many square feet? how many square yards?
19. A piece of carpet contains 18 sq. yd. It is $\frac{2}{3}$ yd wide. How long is it?
20. The step of an ostrich measures 5 ft. How many yards does it travel in taking 120 steps?
21. What will 2 quires 12 sheets of paper cost at 20¢ a quire?
22. I bought a ream of paper for $3, and sold it at $\frac{1}{2}$¢ a sheet. Did I gain or lose, and how much?
23. Bought 2 gross of pencils for $2.60, and sold them for 2¢ apiece. What was the profit?

1. How many months and days since the 28th of last June?

2. What would a man earn since the 28th of last June at $\$1\frac{1}{2}$ a day, not counting the Sundays?

3. How many hours and minutes are you in school during one week, if you lose no time?

4. Harry is $\frac{2}{3}$ as old as his father, who is $\frac{1}{2}$ as old as *his* father. Harry's grandfather is 80 years old. How old are Harry and his father?

5. How far will a man walk in 6 days of 8 hours each at the rate of $2\frac{1}{2}$ miles an hour?

6. How many hours will it take a boy to walk 20 miles at the rate of $2\frac{1}{2}$ miles an hour?

7. James walked a distance of $18\frac{1}{2}$ miles in 5 hours. How many miles an hour did he walk?

8. When peaches are $\$\frac{5}{8}$ a bushel, how many bushels can be bought for \$10?

9. 4 bushels are how many times 4 pecks? how many times 16 quarts?

10. $2\frac{1}{2}$ lb. of tea will cost how many times as much as 4 oz.?

11. .3 of 200 is how many times 8?

12. $\frac{2}{3}$ of 60 is how many times 3?

13. If I pay $\$4\frac{1}{2}$ for 6 lb. of tea, what must I pay for 15 lb.?

14. How many bushels of potatoes at $\$\frac{5}{8}$ a bushel must be given for 8 yd. of cloth at $\$\frac{7}{8}$ a yard?

15. What is the average weight of 6 chickens which weigh all together $10\frac{1}{2}$ lb.?

16. A boy bought apples at the rate of 3 for 2 cents, and sold them at the rate of 2 for 3 cents. How much profit did he make on 30 apples?

17. Two men are 60 miles apart, and travel towards each other one at the rate of $2\frac{1}{2}$ miles an hour, and the other at the rate of 3 miles an hour. How far apart will they be in $4\frac{1}{2}$ hours? In how many hours after starting will they meet?

18. How many cups holding $\frac{1}{2}$ gill could I fill from a coffee-pot containing $1\frac{1}{2}$ gallons?

1. I wish to cut a string $1\frac{1}{2}$ ft. long into pieces $2\frac{1}{2}$ in. long. How many pieces shall I have? How many could I cut from a string $2\frac{1}{2}$ yd. long?

2. What would 4 men earn in $3\frac{1}{2}$ days at $\$1\frac{3}{4}$ a day?

3. I bought 3 packages of tea weighing respectively $2\frac{1}{2}$ lb., $3\frac{3}{4}$ lb., $2\frac{3}{4}$ lb. What did I pay for all, at the rate of 60¢ a pound?

4. From a ten-pound package of coffee there were sold $4\frac{5}{8}$ lb. What is the remainder worth at 30¢ a pound?

5. What will 6 bu. 3 pk. of corn cost at 80¢ a bushel?

6. If you have no change except 10-cent, 25-cent, and 50-cent pieces, how can you make change for $1.40 out of $10?

7. At .2 of a cent apiece, how many pencils can I buy for 8 cents? for $\$\frac{1}{4}$? for $2.40?

8. How many pounds in 6.2 tons?

9. At $6 a ton, what will 1.8 T. of coal cost? 8.3 T.? .65 T.? 1400 lb.? 8.5 cwt.?

10. If .25 T. of hay cost $5, what cost 1.5 T.?

11. Add 2.4 lb.; 3.6 lb.; 4.8 lb.; 8 lb.; 6.9 lb.; 8.7 lb.

12. What decimal of a pound is 4 oz.? 12 oz.? 2 oz.?

13. At 60¢ a pound, what will .75 lb. cost? 2.25 lb.? 6.75 lb.? 5.125 lb.? .87$\frac{1}{2}$ lb.?

14. At 15¢ a quart, what will 1.5 gal. of molasses cost? 3.25 gal.? 9.75 gal.? 4.66$\frac{2}{3}$ qt.?

15. How many square feet in a floor 16.25 ft. long, 12 ft. wide? how many square yards? At 60¢ a square yard, what will a carpet for the floor cost?

16. If the above room is 8 ft. high, how many square feet in the walls? how many square yards?

17. I bought 8 bbl. of flour at $\$6.37\frac{1}{2}$ a barrel, and paid for them in apples at 87$\frac{1}{2}$¢ a bushel. How many bushels did I give?

Cost of:

18. 98 bbl. flour @ $6?
19. 7 bu. of wheat @ 68¢?
20. 84 T. of coal @ $7?
21. 9 bu. corn @ 58¢?
22. 18 lb. of meat @ 17¢?
23. 48 M. of boards @ $16?

Written Review Exercises.

Add the following ledger columns :

1.	2.	3.	4.
$140.16	$20.08	$3140.67	$209.34
2918.69	821.74	483.24	2169.78
74.96	3694.81	6150.08	359.27
4806.83	746.43	700.93	28.63
3681.28	5609.03	8216.42	436.58
29.91	7094.68	629.74	937.41
745.55	3415.62	837.27	86.93
90.87	776.89	42.86	847.28
57.72	289.73	203.96	45.37
6533.84	2530.14	1964.27	634.28
412.40	95.28	483.46	29.74
874.32	4643.67	114.23	974.93
48.63	708.05	986.25	48.35

Find the cost of

5. 467 bbl. flour @ $5.75.
6. 87 T. coal @ $6.25.
7. 387 bu. corn @ 72¢.
8. 49 bbl. oil @ $9.72.
9. 56 bbl. beef @ $17.50.

Find the cost of

10. 46 doz. eggs @ 32¢.
11. 120 doz. hdkfs. @ $1.80.
12. 54 boxes raisins @ $1.75.
13. 63 cows @ $36.
14. 487 lb. pork @ 6½¢.

15. A money-drawer contains 14 five-dollar bills, 13 two-dollar bills, 24 half dollars, 16 quarter dollars, 37 ten cent pieces, 48 nickels, and 61 pennies. How much money in all?

16. A contractor pays 28 men $1.75 a day. How much does he pay out every week?

17. A man's estate is valued at $24,400. If he leaves ¼ of it to his 3 sons, and the remainder to his widow, what does each son and the widow receive?

18. How much will 32 carpenters earn in a month of 26 days, working 8 hours a day, at the rate of $\$\frac{1}{3}$ an hour each?

1. The following is a revised estimate of the area and population of the earth in 1890. Find the total area and population; also number of inhabitants per square mile.

	Area, Square Miles.	Population.	Per Square Mile.
Europe	3,555,000	360,200,000	
Asia	14,710,000	850,000,000	
Africa	11,514,000	127,000,000	
Australasia and Pacific	3,300,000	4,750,000	
North America and West Indies	6,446,000	89,250,000	
South America	6,837,000	36,420,000	
Polar regions	4,888,800	300,000	
Total			

2. Compare the area of Europe with that of each of the other divisions mentioned above. Give actual difference, and how many times larger than Europe each division is.

3. Compare the population of Europe with that of each of the other divisions mentioned above.

4. The area of the United States in 1890 was 3,501,410 square miles, and the population 62,831,827. Compare these figures with the figures given in the above table.

What is the cost of

5. 180 lb. sugar @ $6\frac{1}{4}¢$? @ $8\frac{1}{3}¢$? @ $5\frac{3}{4}¢$?
6. 78 pairs shoes @ \$1.50? @ \$2.25? @ $\$1\frac{3}{8}$?
7. 342 lb. raisins @ $16\frac{2}{3}¢$? @ $14\frac{1}{2}¢$? @ $12\frac{1}{2}¢$?
8. 81 bu. potatoes @ $62\frac{1}{2}¢$? @ $87\frac{1}{2}¢$? @ $66\frac{2}{3}¢$?
9. 39 T. coal @ $\$5\frac{3}{4}$? @ $\$6\frac{1}{4}$? @ $\$6\frac{3}{8}$?
10. 486 cwt. rice @ \$8.25? @ \$7.75? @ $\$6.37\frac{1}{2}$?
11. 84 horses @ \$175? @ \$260? @ \$340?
12. 48 chairs @ $\$1\frac{1}{8}$? @ $\$1.37\frac{1}{2}$? @ $\$.66\frac{2}{3}$?

13. At $\frac{2}{3}¢$ apiece, how many pencils can be bought for \$1.20? for \$6? for \$15?

1. A contractor received $48,000 for building a school-house. He paid $\frac{3}{5}$ of what he received for labor, $\frac{1}{4}$ of it for stock, and the rest was profit. How much was profit?

2. A train of cars going at the rate of 25 miles an hour will take how long to go from New York to San Francisco? (Find distance on the map.)

3. At the rate of 2 for 5¢, how many oranges can I buy for $40?

4. A marketman sold at different times $28\frac{3}{4}$ bu., $16\frac{1}{2}$ bu. $46\frac{3}{4}$ bu., $17\frac{5}{8}$ bu., 18 bu. of potatoes. How much in all, and for how much at 60¢ a bushel?

5. How many barrels of apples at $\$3\frac{1}{3}$ a barrel will pay for 18 tons of hay at $16.50 a ton?

6. I bought $8\frac{1}{4}$ tons of furnace coal at $6.25 a ton, and $6\frac{5}{8}$ tons of stove coal at $6.50 a ton. What did I pay for all?

7. Add 2.09, 13.694, 103.05, 40.006, 13,047, 436.9, 809.36.

8. Add two and six hundredths, sixteen and twenty-five hundredths, four hundred eight and eight thousandths, four thousand nine and twelve thousandths.

9. Add 4604 and 8 hundredths, 2046 and 54 thousandths, 37 and 9 tenths, 565 and 75 hundredths, 408 thousandths, 6706 and 28 thousandths.

10. From 418.987 take 307.38.

11. From 6094.003 take 489.068.

12. From one thousand forty take five hundred sixty and eighty-three thousandths.

13. From six thousand five hundred seventy-six and twelve thousandths take five hundred nine and eighty-seven thousandths.

14. Multiply 286.08 by 100; by 432; by 1009.

15. Multiply 1000 by .1; by .01; by .001.

16. Multiply 4000 by .4; by .06; by .008.

17. Multiply 6840 by .25; by .7; by .725.

18. Multiply 86 by .08; by 634; by .408.

19. Multiply 6008 by .9; by .008; by .608.

20. Divide 23.04 by 3; by 6; by 30.

1. Divide 146.88 by 4; by 40; by 36.

2. Divide 7.14 by 3; by .02; by .3.

3. Divide 714.06 by 18; by .18; by 1.8.

4. If in a fence 172.8 ft. long there are 18 panes, how long is each pane?

5. How many panes of fence 12.4 ft. long in a fence 124 ft. long?

6. If $1\frac{1}{2}$ bbl. of apples cost $4.50, what will 1 bbl. cost? What will 3.25 bbl. cost?

7. 2.5 lb. of butter cost 50¢. What is the price of 1 lb.? $14\frac{3}{4}$ lb.?

8. $2\frac{2}{3}$ acres of land are sold for $160. What was paid for $25\frac{3}{8}$ acres at the same rate?

9. A man by working $8\frac{1}{3}$ hours a day can do a piece of work in 6 days. In how many days can he do it if he works 10 hours a day?

10. At $4.5 a barrel, how many barrels can be bought for $90?

11. At the rate of $.015 each, how many pencils can I get for $30? How many dozen?

12. In a town of 4200 inhabitants .9 are white, .07 are negroes, and the remainder are Chinese. How many of each?

13. How many sheep at $15 apiece will pay for 60 cows at $43.50 apiece?

14. How many eggs at $\$\frac{1}{3}$ a dozen will pay for $36\frac{2}{3}$ cords of wood at $6 a cord? (Answer in dozens.)

15. What will 24 bu. 1 pk. of corn cost at $87\frac{1}{2}$¢ a bushel?

16. A cargo of wheat weighing 19 T. 6 cwt. contains how many bushels, counting 60 lb. to a bushel? How many loads of 1800 lb. each in the cargo? If it cost $1.08 a cental (100 lb.) and was sold for 85¢ a bushel, what was the profit?

17. How many years, months, and days from January 1, 1890, to March 8, 1892? from September 16, 1891, to July 1, 1893?

18. What will $46\frac{2}{3}$ reams of paper cost at 8¢ a quire?

19. Bought a bale of paper at $2.25 a ream, and sold it at the rate of $\frac{3}{4}$¢ a sheet. What was the profit?

20. What is 8.2 T. of iron worth at $4\frac{1}{2}$¢ a pound?

21. A barrel of flour weighs 196 lb. How many tons do 87 barrels weigh?

SECTION II.

FACTORS, MULTIPLES, AND FRACTIONS.

Oral Exercises.

1. Give five odd numbers.

2. Give all the odd numbers from 1 to 39.

3. Give all the even numbers from 2 to 40.

4. Give the factors of 6; 8; 12; 15; 20; 32; 48.

5. Name five other composite numbers.

6. Give a number that has no factors except itself or one. This is a prime number. Name all the prime numbers from 1 to 47.

7. Give five numbers divisible by 3.

8. What numbers are divisible by 3? Give examples.

9. Give some numbers divisible by 5.

10. What numbers are divisible by 5?

11. What numbers are divisible by 2? by 4? by 6? by 9? Give examples of each.

12. What are the factors of 30? 45? 60? 90?

13. What are the prime factors of 8? 12? 24? 30?

14. Name five numbers of which 2 is a factor.

15. Name five other multiples of 2.

16. Name five multiples of 3; of 4; of 6; of 8.

17. Name a common multiple of 2 and 4; of 4 and 6; of 6 and 8; of 8 and 12; of 10 and 20.

18. Name a common multiple of 8 and 12; of 6, 8, 12; of 2, 3, and 4; of 3, 4, and 6; of 9, 8, and 6; of 3, 5, and 10.

19. Name the least number which is a multiple of both 2 and 3; of 4 and 6; of 2 and 4; of 4 and 8; of 6 and 9; of 8 and 12.

20. What is the least common multiple of 6 and 12? of 6 and 10? of 6 and 15? of 10 and 15? of 20 and 30? of 8 and 12; of 9 and 12; of 12 and 20?

1.	2.	3.
L. C. M. of	L. C. M. of	L. C. M. of
4 and 16?	2, 3, and 4?	4, 16, and 32?
8 and 20?	3, 4, and 5?	8, 10, and 20?
6 and 9?	4, 5, and 6?	6, 9, and 36?
6 and 18?	4, 6, and 8?	6, 12, and 36?
3 and 7?	2, 6, and 8?	6, 15, and 30?
8 and 9?	4, 6, and 10?	6, 8, and 24?
9 and 12?	2, 8, and 12?	8, 12, and 24?
10 and 25?	4, 9, and 12?	8, 12, and 16?
15 and 20?	6, 9, and 12?	8, 16, and 24?
18 and 36?	8, 9, and 12?	10, 20, and 30?

A.	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*
1	11	2	20	39	64	81
2	12	4	22	40	65	84
3	13	6	24	42	69	85
4	14	8	25	45	70	86
5	15	9	27	46	72	88
6	16	10	30	48	74	90
7	17	12	32	50	75	94
8	18	15	33	54	76	95
9	19	16	35	56	78	96
10	20	18	36	60	80	100

4. Give the prime factors of all numbers in column *A*.
5. Give the prime factors of all numbers in column *B*.
6. Give the factors of all numbers in column *C*.
7. Give the prime factors of all numbers in column *C*.
8. Give the factors of all numbers in column *D*.
9. Give the prime factors of all numbers in column *D*.
10. Give the prime factors of all numbers in column *E*.
11. Give the prime factors of all numbers in column *F*.
12. Give the prime factors of all numbers in column *G*.
13. Give a multiple of each number in column *A*.

Oral and Written Exercises.

1. Give the common factors of 8 and 12; 6 and 12; 8 and 18; 12 and 20; 15 and 18.

2. Give the common factors of 12 and 18; 15 and 24; 16 and 24; 24 and 30; 28 and 32.

3. What is the greatest common divisor of 10 and 20? 12 and 15? 15 and 25? 24 and 36? 36 and 48?

4. What is the greatest common divisor of 18 and 24? 15 and 45? 20 and 30? 32 and 48? 48 and 64?

5. Find the prime factors of 72; 84; 96; 108; 120; 144; 160; 180; 176; 196.

6 Find the prime factors of 240; 320; 480; 500; 560; 620; 720; 780; 840; 1000.

7. Find the common factors of 64 and 96; 108 and 184; 180 and 196; 320 and 480; 450 and 600.

8. Find the common factors of 84 and 100; 120 and 160; 136 and 125; 487 and 369; 876 and 390.

What is the greatest common divisor of:

9 24 and 48? 24 and 36? 24 and 32? 24 and 28?

10 36 and 84? 64 and 96? 120 and 330? 180 and 64?

11. 246 and 138? 228 and 162? 148 and 182? 232 and 160?

12. Find all the different factors of 8 and 12; 8 and 18; 12 and 18; 12 and 15; 15 and 20; 20 and 14; 24 and 30; 30 and 36; 36 and 40; 42 and 48; 48 and 60.

13. Find the least common multiple of 6 and 9; 12 and 15; 15 and 18; 18 and 24; 24 and 30.

14. Find the least common multiple of 40 and 80; 60 and 90; 120 and 180; 72 and 96; 81 and 108.

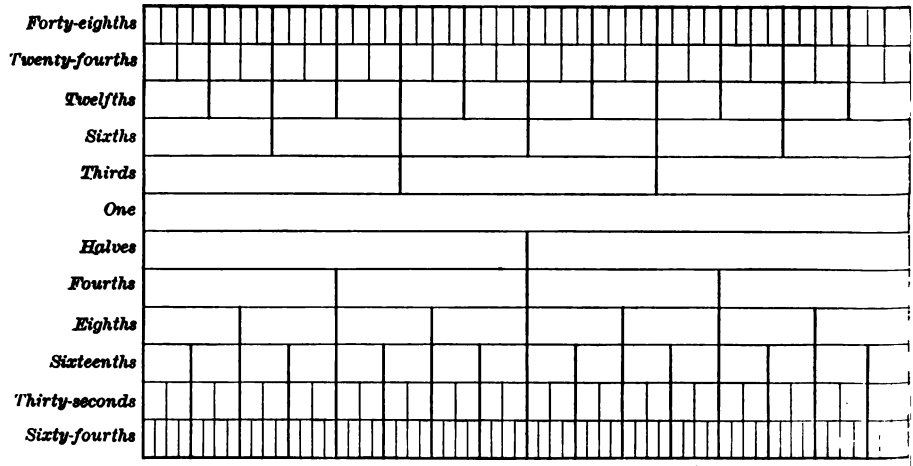
15. Find the least common multiple of 160 and 180; 90, 120, and 150; 80, 120, and 200; 360 and 487; 63 and 315.

16. Find the least common multiple of 8, 12, 24, and 36; 18, 20, 24, and 30; 42, 48, 60, and 90; 72, 84, 90, and 100.

Find the least common multiple of the denominators of:

17. $\frac{1}{16}$ and $\frac{3}{30}$; $\frac{8}{27}$ and $\frac{17}{81}$; $\frac{13}{70}$ and $\frac{6}{50}$; $\frac{6}{48}$ and $\frac{7}{60}$.

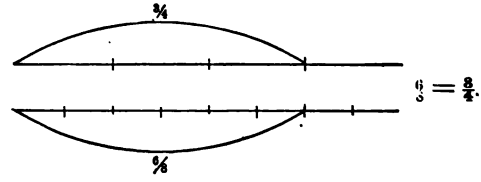
18. $\frac{11}{120}$ and $\frac{7}{90}$; $\frac{8}{75}$ and $\frac{6}{130}$; $\frac{8}{98}$ and $\frac{23}{120}$; $\frac{12}{320}$ and $\frac{13}{240}$.



1. By laying a straight-edge on the above diagram, show how many of higher terms $\frac{1}{2}$ equals. Thus: $\frac{1}{2} = \frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, etc. In the same way proceed with $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{6}$; $\frac{1}{8}$; $\frac{1}{12}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{6}{8}$; $\frac{8}{8}$; $\frac{5}{8}$; etc.

2. From the above diagram change to lower terms $\frac{6}{12}$; $\frac{8}{16}$; $\frac{12}{24}$; $\frac{9}{12}$; $\frac{12}{16}$; $\frac{10}{16}$; $\frac{20}{24}$; $\frac{16}{24}$; $\frac{12}{48}$; $\frac{20}{48}$; $\frac{8}{32}$; $\frac{12}{32}$; $\frac{16}{64}$; $\frac{24}{64}$; $\frac{32}{64}$; $\frac{48}{64}$.

3. See if you can do the same thing with lines; thus:



4. When you reduce sixteenths to eighths, or eighths to fourths, have you larger or smaller fractional parts? Have you more or less parts? Show by lines.

5. In reducing thirds to sixths, have you larger or smaller fractional parts? Have you more or less parts?

$$\frac{12}{24} = \frac{6}{12} = \frac{3}{6} = \frac{1}{2}$$

1. In reducing 24ths to 12ths above, what is done to both numerator and denominator? How may you change fractions to lower terms?

$$\frac{1}{3} = \frac{3}{9} \qquad \frac{3}{4} = \frac{9}{12}$$

2. What is done to $\frac{1}{3}$ and $\frac{3}{4}$? Has the size of the fraction been changed? What has been changed in reducing thirds to ninths and fourths to twelfths? How may you change fractions to higher terms?

3. Change to their smallest terms: $\frac{2}{8}$; $\frac{4}{8}$; $\frac{4}{12}$; $\frac{3}{12}$; $\frac{8}{12}$; $\frac{2}{10}$; $\frac{5}{10}$; $\frac{3}{15}$; $\frac{5}{15}$; $\frac{4}{16}$.

4. Change to their smallest terms; $\frac{6}{8}$; $\frac{9}{12}$; $\frac{10}{12}$; $\frac{8}{12}$; $\frac{6}{15}$; $\frac{12}{18}$; $\frac{9}{15}$; $\frac{6}{18}$; $\frac{10}{18}$; $\frac{12}{18}$.

5. Change to their smallest terms: $\frac{6}{20}$; $\frac{8}{20}$; $\frac{12}{20}$; $\frac{15}{20}$; $\frac{10}{24}$; $\frac{15}{24}$; $\frac{18}{24}$; $\frac{20}{24}$; $\frac{12}{27}$; $\frac{21}{27}$.

6. Change to 16ths: $\frac{1}{2}$; $\frac{1}{4}$; $\frac{3}{4}$; $\frac{1}{8}$; $\frac{3}{8}$; $\frac{5}{8}$; $\frac{7}{8}$; 1; $2\frac{1}{2}$; $3\frac{1}{8}$.

7. Change $\frac{2}{3}$ to equivalent fractions having 9, 12, 15, 27, 30, 36, 24, 48, 42, 18 for denominators.

8. Change $\frac{3}{4}$, $\frac{5}{6}$, $\frac{4}{5}$, $\frac{7}{12}$, $\frac{11}{20}$, $\frac{8}{15}$, $\frac{7}{30}$ back to an equivalent fraction having 60 for a denominator.

9. Change $\frac{3}{4}$ to equivalent fractions having 8, 12, 16, 36, 48, 32, 60, 80, 56, 68 for denominators.

10. Change the following to equivalent fractions of smallest terms: $\frac{12}{18}$; $\frac{16}{24}$; $\frac{24}{30}$; $\frac{32}{48}$; $\frac{40}{60}$; $\frac{50}{75}$; $\frac{325}{1250}$; $\frac{375}{1500}$; $\frac{450}{1800}$; $\frac{775}{2000}$.

Change	Change
11. $\frac{2}{3}$, $\frac{5}{8}$, $\frac{7}{8}$, $\frac{9}{12}$, $\frac{4}{18}$ to 72ds.	14. $\frac{17}{20}$, $\frac{23}{24}$, $\frac{14}{30}$ to 120ths.
12. $\frac{4}{8}$, $\frac{3}{4}$, $\frac{7}{16}$, $\frac{5}{24}$, $\frac{5}{6}$ to 48ths.	15. $\frac{17}{18}$, $\frac{13}{30}$, $\frac{13}{45}$ to 90ths.
13. $\frac{5}{8}$, $\frac{3}{4}$, $\frac{11}{12}$, $\frac{2}{3}$, $\frac{17}{18}$ to 36ths.	16. $\frac{7}{25}$, $\frac{13}{75}$, $\frac{18}{30}$ to 150ths.

17. To what common fraction can you change 8ths and 12ths? 9ths and 12ths? 15ths and 12ths? 15ths and 18ths? 24ths and 30ths?

1. Change the following fractions to fractions having a common denominator: $\frac{1}{20}$; $\frac{8}{40}$; $\frac{17}{60}$; $\frac{14}{80}$.

2. Change the following fractions to fractions having the least common denominator: $\frac{17}{24}$; $\frac{23}{36}$; $\frac{31}{48}$; $\frac{41}{72}$.

Change to fractions having a least common denominator:

3. $\frac{1}{2}$, $\frac{8}{8}$, $\frac{9}{12}$, and $\frac{18}{24}$.
4. $\frac{11}{20}$, $\frac{16}{24}$, $\frac{7}{18}$, and $\frac{12}{40}$.
5. $\frac{11}{21}$, $\frac{13}{63}$, $\frac{14}{42}$, and $\frac{10}{126}$.
6. $\frac{5}{12}$, $\frac{7}{20}$, $\frac{18}{42}$, and $\frac{16}{48}$.
7. $\frac{2}{3}$, $\frac{11}{12}$, $\frac{14}{15}$, and $\frac{18}{25}$.
8. $\frac{4}{7}$, $\frac{8}{12}$, $\frac{13}{14}$, and $\frac{5}{6}$.
9. $\frac{17}{18}$, $\frac{16}{21}$, $\frac{15}{27}$, and $\frac{18}{36}$.
10. $\frac{14}{24}$, $\frac{13}{18}$, $\frac{27}{30}$, and $\frac{17}{32}$.

Oral Exercises.

Find the sum of:

11. $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$
12. $\frac{3}{4}+\frac{2}{3}+\frac{5}{6}$
13. $\frac{1}{2}+\frac{7}{9}+\frac{2}{3}$
14. $\frac{3}{4}+\frac{5}{6}+\frac{3}{8}$
15. $\frac{2}{3}+\frac{5}{7}+\frac{1}{3}$
16. $\frac{5}{8}+\frac{3}{4}+\frac{9}{16}$
17. $\frac{7}{10}+\frac{2}{4}+\frac{3}{5}$
18. $\frac{4}{9}+\frac{5}{12}+\frac{3}{4}$
19. $\frac{3}{5}+\frac{2}{3}+\frac{11}{12}$

Add by columns, then by lines:

	20.	21.	22.	23.
24.	$\frac{2}{3}$	$+\frac{1}{4}$	$+\frac{5}{6}$	$+\frac{1}{2}$
25.	$\frac{5}{6}$	$+\frac{2}{3}$	$+\frac{1}{2}$	$+\frac{1}{3}$
26.	$\frac{4}{9}$	$+\frac{5}{12}$	$+\frac{2}{4}$	$+\frac{2}{3}$
27.	$\frac{1}{2}$	$+\frac{1}{3}$	$+\frac{3}{8}$	$+\frac{3}{4}$
28.	$\frac{6}{12}$	$+\frac{6}{9}$	$+\frac{1}{3}$	$+\frac{6}{8}$

	29.	30.	31.	32.
33.	$\frac{3}{4}$	$+\frac{1}{2}$	$+\frac{5}{8}$	$+\frac{7}{8}$
34.	$\frac{2}{3}$	$+\frac{5}{6}$	$+\frac{7}{12}$	$+\frac{1}{2}$
35.	$\frac{5}{6}$	$+\frac{2}{3}$	$+\frac{1}{2}$	$+\frac{2}{4}$
36.	$\frac{7}{12}$	$+\frac{1}{3}$	$+\frac{3}{4}$	$+\frac{1}{2}$
37.	$\frac{3}{8}$	$+\frac{3}{12}$	$+\frac{4}{6}$	$+\frac{3}{9}$

Add by columns, then by lines:

	38.	39.	40.	41
42.	$\frac{1}{4}$	$+\frac{1}{3}$	$+\frac{1}{2}$	$+\frac{1}{3}$
43.	$\frac{2}{3}$	$+\frac{3}{4}$	$+\frac{7}{8}$	$+\frac{1}{2}$
44.	$\frac{1}{2}$	$+\frac{2}{3}$	$+\frac{3}{4}$	$+\frac{5}{6}$
45.	$\frac{5}{6}$	$+\frac{5}{9}$	$+\frac{2}{3}$	$+\frac{1}{2}$
46.	$\frac{3}{4}$	$+\frac{1}{2}$	$+\frac{5}{12}$	$+\frac{2}{3}$
47.	$\frac{10}{12}$	$+\frac{4}{18}$	$+\frac{5}{6}$	$+\frac{8}{9}$

	48.	49.	50.	51.
52.	$\frac{1}{3}$	$+\frac{3}{5}$	$+\frac{2}{3}$	$+\frac{4}{5}$
53.	$\frac{4}{9}$	$+\frac{1}{2}$	$+\frac{5}{6}$	$+\frac{2}{3}$
54.	$\frac{1}{12}$	$+\frac{4}{5}$	$+\frac{3}{4}$	$+\frac{1}{3}$
55.	$\frac{5}{6}$	$+\frac{3}{10}$	$+\frac{1}{2}$	$+\frac{4}{5}$
56.	$\frac{3}{4}$	$+\frac{1}{2}$	$+\frac{2}{3}$	$+\frac{1}{3}$
57.	$\frac{9}{12}$	$+\frac{12}{15}$	$+\frac{6}{9}$	$+\frac{5}{6}$

1. Name three fractions that can be reduced to 8ths; to 12ths.
2. Name three fractions that can be reduced to 16ths; to 18ths.
3. Name four fractions that can be reduced to 48ths; to 60ths.
4. Name four fractions that can be reduced to 36ths; to 90ths.

Find the sum of :

	5.	6.	7.	8.
a.	$\frac{8}{8} + \frac{7}{16}$	$\frac{7}{24} + \frac{5}{6}$	$\frac{8}{9} + \frac{11}{36} + \frac{1}{2}$	$\frac{7}{12} + \frac{5}{6} + \frac{7}{30}$
b.	$\frac{11}{24} + \frac{7}{9}$	$\frac{8}{30} + \frac{11}{12}$	$\frac{2}{3} + \frac{17}{18} + \frac{1}{12}$	$\frac{7}{8} + \frac{1}{18} + \frac{5}{12}$
c.	$\frac{7}{12} + \frac{11}{20}$	$\frac{15}{16} + \frac{4}{5}$	$\frac{14}{15} + \frac{4}{5} + \frac{2}{3}$	$\frac{7}{30} + \frac{1}{15} + \frac{3}{20}$
d.	$\frac{7}{12} + \frac{8}{9}$	$\frac{3}{4} + \frac{6}{7}$	$\frac{2}{3} + \frac{7}{8} + \frac{5}{12}$	$\frac{1}{8} + \frac{6}{7} + \frac{5}{6}$
e.	$\frac{15}{16} + \frac{11}{24}$	$\frac{11}{36} + \frac{5}{9}$	$\frac{1}{8} + \frac{2}{15} + \frac{1}{9}$	$\frac{7}{36} + \frac{5}{24} + \frac{1}{2}$

Find the sum of :

	9.	10.	11.	12.
a.	$\frac{11}{18} + \frac{4}{5}$	$\frac{11}{30} + \frac{7}{45}$	$\frac{7}{12} + \frac{8}{9} + \frac{5}{6}$	$\frac{14}{15} + \frac{1}{12} + \frac{5}{6}$
b.	$\frac{11}{24} + \frac{7}{18}$	$\frac{8}{9} + \frac{7}{15}$	$\frac{8}{8} + \frac{5}{7} + \frac{3}{4}$	$\frac{4}{15} + \frac{1}{30} + \frac{7}{10}$
c.	$\frac{9}{20} + \frac{11}{30}$	$\frac{30}{40} + \frac{20}{30}$	$\frac{7}{12} + \frac{9}{18} + \frac{5}{6}$	$\frac{3}{15} + \frac{11}{25} + \frac{4}{5}$
d.	$\frac{28}{40} + \frac{20}{30}$	$\frac{18}{72} + \frac{16}{64}$	$\frac{48}{60} + \frac{36}{48} + \frac{18}{24}$	$\frac{12}{25} + \frac{25}{30} + \frac{30}{40}$
e.	$\frac{60}{72} + \frac{45}{60}$	$\frac{18}{27} + \frac{17}{18}$	$\frac{12}{90} + \frac{7}{15} + \frac{8}{45}$	$\frac{60}{72} + \frac{45}{60} + \frac{48}{80}$

	13.	14.	15.	16.	17.
a.	$\frac{7}{8} - \frac{1}{3}$	$1\frac{1}{12} - \frac{1}{2}$	$\frac{5}{8} - \frac{1}{4}$	$\frac{1}{2} - \frac{3}{7}$	$\frac{5}{6} - \frac{7}{12}$
b.	$1\frac{3}{5} - \frac{3}{4}$	$1\frac{5}{12} - \frac{1}{4}$	$\frac{7}{9} - \frac{1}{2}$	$1\frac{4}{5} - \frac{3}{4}$	$\frac{5}{8} - \frac{11}{24}$
c.	$1\frac{3}{4} - \frac{2}{3}$	$\frac{7}{12} - \frac{1}{3}$	$\frac{4}{5} - \frac{2}{3}$	$2\frac{1}{2} - \frac{6}{7}$	$\frac{1}{2} - \frac{3}{10}$

	18.	19.	20.	21.	22.
a.	$4 - \frac{1}{2}$	$12 - \frac{3}{11}$	$2\frac{3}{4} - \frac{1}{4}$	$9\frac{4}{11} - \frac{3}{11}$	$2\frac{3}{8} - \frac{5}{8}$
b.	$7 - \frac{3}{5}$	$17 - \frac{5}{24}$	$5\frac{5}{6} - \frac{2}{3}$	$15\frac{4}{25} - \frac{9}{25}$	$6\frac{7}{12} - \frac{11}{12}$
c.	$9 - \frac{7}{8}$	$1 - \frac{8}{9}$	$3\frac{6}{7} - \frac{4}{7}$	$9\frac{9}{10} - \frac{7}{10}$	$8\frac{1}{8} - \frac{5}{8}$

	23.	24.	25.	26.
a.	$3\frac{2}{3} - \frac{7}{9}$	$8\frac{5}{24} - \frac{19}{24}$	$8\frac{1}{4} - \frac{3}{4}$	$12\frac{1}{2} - \frac{3}{14}$
b.	$6\frac{1}{3} - \frac{4}{5}$	$7\frac{2}{27} - \frac{11}{27}$	$46\frac{3}{7} - \frac{6}{7}$	$16\frac{4}{5} - \frac{2}{3}$
c.	$12\frac{3}{7} - \frac{6}{7}$	$3\frac{5}{11} - \frac{10}{11}$	$52\frac{2}{21} - \frac{19}{21}$	$21\frac{5}{8} - \frac{3}{4}$
d.	$10\frac{3}{10} - \frac{7}{10}$	$6\frac{1}{18} - \frac{7}{15}$	$100\frac{1}{14} - \frac{9}{14}$	$42\frac{7}{9} - \frac{1}{18}$
e.	$8\frac{2}{15} - \frac{7}{15}$	$4\frac{3}{16} - \frac{15}{16}$	$201\frac{1}{5} - \frac{4}{5}$	$9\frac{6}{7} - \frac{1}{2}$

	1.	2.	3.	4.
a.	$8\frac{3}{4} - 6\frac{1}{4}$	$28\frac{5}{12} - 9\frac{11}{12}$	$60\frac{1}{5} - 1\frac{4}{5}$	$9\frac{3}{25} - 6\frac{13}{25}$
b.	$17\frac{3}{8} - 6\frac{4}{8}$	$57\frac{3}{8} - 2\frac{7}{8}$	$41\frac{3}{14} - 1\frac{5}{14}$	$17\frac{4}{30} - 1\frac{13}{30}$
c.	$8\frac{3}{7} - 4\frac{5}{7}$	$22\frac{4}{15} - 1\frac{14}{15}$	$200\frac{1}{4} - 9\frac{3}{4}$	$18\frac{7}{8} - 2\frac{3}{8}$
d.	$6\frac{1}{9} - 2\frac{7}{9}$	$81\frac{3}{11} - 4\frac{9}{11}$	$101\frac{3}{5} - 10\frac{4}{5}$	$9\frac{4}{7} - 7\frac{1}{4}$
e.	$8\frac{9}{12} - 3\frac{5}{6}$	$7\frac{6}{9} - 3\frac{1}{8}$	$20\frac{6}{10} - 12\frac{4}{5}$	$18\frac{1}{8} - 16\frac{19}{24}$

	5.	6.	7.	8.
a.	$\frac{3}{4} - \frac{7}{12}$	$\frac{14}{15} + \frac{5}{9}$	$\frac{18}{24} + \frac{15}{18} - \frac{5}{6}$	$\frac{11}{20} + \frac{7}{30} - \frac{11}{15}$
b.	$\frac{5}{8} + \frac{3}{4} - \frac{5}{6}$	$\frac{3}{7} + \frac{2}{3} + \frac{5}{7}$	$\frac{3}{4} + \frac{2}{5} + \frac{9}{10}$	$\frac{5}{6} + \frac{1}{4} + \frac{2}{3}$
c.	$\frac{1}{6} + \frac{2}{3} - \frac{5}{9}$	$\frac{7}{9} + \frac{2}{3} + \frac{1}{9}$	$\frac{5}{6} + \frac{7}{10} - \frac{1}{3}$	$\frac{3}{8} + \frac{1}{4} - \frac{5}{16}$
d.	$\frac{3}{5} + \frac{2}{3} - \frac{9}{15}$	$\frac{3}{4} + \frac{5}{6} - \frac{7}{12}$	$\frac{7}{12} + \frac{1}{2} - \frac{5}{6}$	$\frac{8}{9} + \frac{3}{4} - \frac{1}{8}$
e.	$\frac{4}{3} + \frac{8}{12} - \frac{4}{6}$	$\frac{15}{24} + \frac{15}{18} - \frac{5}{12}$	$\frac{6}{9} + \frac{15}{21} - \frac{6}{7}$	$\frac{12}{16} + \frac{9}{18} - \frac{6}{9}$

	9.	10.	11.	12.
a.	$5\frac{1}{2} + 2\frac{3}{4}$	$2\frac{3}{7} + 6\frac{1}{2}$	$5\frac{7}{8} + 6\frac{3}{4} + 1\frac{1}{2}$	$2\frac{3}{8} + 3\frac{1}{6} + 2\frac{9}{10}$
b.	$6\frac{5}{9} + 4\frac{1}{2}$	$2\frac{1}{6} + 3\frac{3}{8}$	$9\frac{1}{2} + 2\frac{3}{4} - 2\frac{3}{8}$	$8\frac{1}{3} + 2\frac{3}{4} - 1\frac{9}{10}$
c.	$1\frac{1}{2} - \frac{5}{9} + \frac{5}{6}$	$1 - \frac{7}{8} + 9\frac{3}{5}$	$20 - \frac{9}{11} + 2\frac{1}{2}$	$30 - \frac{2}{3} + 9\frac{5}{7}$
d.	$40 - 2\frac{5}{8} - 9\frac{1}{4}$	$25 - 6\frac{4}{7} + 1\frac{1}{2}$	$42 - 7\frac{3}{7} - 4\frac{3}{4}$	$100 - 90\frac{5}{6} + \frac{3}{4}$
e.	$3\frac{1}{4} - 2\frac{1}{2} + 19$	$6\frac{5}{7} + 9\frac{3}{4} - 12\frac{1}{2}$	$50 - 9\frac{15}{21} + 2\frac{1}{3}$	$80 - 16\frac{4}{9} + 2\frac{5}{6}$

	13.	14.	15.	16.
a.	$2\frac{5}{8} - 1\frac{2}{3} + \frac{5}{6}$	$6\frac{7}{9} - 5\frac{1}{3} + \frac{5}{27}$	$4\frac{5}{12} - 2\frac{1}{6} + \frac{19}{24}$	$5\frac{4}{5} - 3\frac{1}{2} + \frac{9}{10}$
b.	$16\frac{5}{11} - \frac{1}{2} + 9\frac{1}{2}$	$12\frac{5}{8} - \frac{4}{5} + 2\frac{1}{3}$	$16\frac{7}{8} - 1\frac{1}{2} + 9\frac{3}{8}$	$14\frac{1}{2} - \frac{4}{5} + 9\frac{3}{4}$
c.	$\frac{5}{8} + 6\frac{1}{2} - \frac{7}{12}$	$\frac{10}{21} - \frac{9}{42} + 2\frac{5}{42}$	$\frac{19}{36} - \frac{1}{6} + 19\frac{5}{18}$	$\frac{20}{45} - \frac{3}{7} + 16$
d.	$\frac{4}{7} + \frac{1}{2} - \frac{9}{14}$	$\frac{5}{6} + \frac{3}{5} - \frac{18}{30}$	$\frac{3}{8} + \frac{1}{2} + \frac{18}{16}$	$3\frac{4}{5} - 1\frac{7}{5} + 18\frac{1}{2}$
e.	$\frac{8}{9} + \frac{3}{4} - \frac{30}{36}$	$\frac{8}{8} + 2\frac{1}{5} - \frac{13}{40}$	$\frac{5}{21} + 2\frac{4}{7} - \frac{1}{3}$	$\frac{6}{8} + 1\frac{3}{4} - 2\frac{1}{2}$

	17.	18.	19.	20.
a.	$\frac{2}{3} + \frac{7}{9} - \frac{1}{2}$	$\frac{7}{8} + 2\frac{1}{3} - \frac{15}{24}$	$\frac{8}{15} + 2\frac{3}{5} - \frac{32}{45}$	$9\frac{1}{2} + 2\frac{3}{5} - \frac{9}{10}$
b.	$\frac{4}{5} + \frac{5}{6} - \frac{7}{30}$	$\frac{7}{12} - \frac{1}{2} + 19\frac{4}{5}$	$7\frac{1}{2} + 6\frac{3}{4} - 9\frac{7}{8}$	$7\frac{4}{15} + 6\frac{9}{30} - 7$
c.	$2\frac{1}{2} + 4\frac{5}{6} - 1\frac{1}{12}$	$4\frac{1}{2} + \frac{9}{16} - \frac{8}{8}$	$2\frac{5}{8} - 1\frac{7}{8} + \frac{3}{4}$	$4\frac{1}{2} + 6\frac{3}{11} - 1\frac{9}{22}$
d.	$3\frac{1}{8} + 6\frac{5}{12} - \frac{7}{24}$	$8\frac{2}{3} + 6\frac{4}{9} - 1\frac{1}{6}$	$8\frac{1}{4} + 7\frac{5}{8} - 3\frac{5}{12}$	$4\frac{5}{7} + 8\frac{3}{4} - 3\frac{3}{4}$
e.	$8\frac{5}{16} + 9\frac{5}{12} - 2\frac{1}{12}$	$7\frac{8}{12} + 6\frac{5}{6} - 3\frac{14}{18}$	$9\frac{5}{18} + 8\frac{3}{4} - 3\frac{1}{18}$	$8\frac{8}{8} - 2\frac{5}{6} - 3\frac{8}{8}$
f.	$9\frac{3}{8} + 5\frac{5}{6} + 8\frac{7}{12}$	$4\frac{4}{8} + 8\frac{7}{8} - 9\frac{5}{6}$	$18\frac{4}{5} + 6\frac{1}{2} - 9\frac{9}{10}$	$24\frac{8}{9} - 6\frac{14}{15} - 4\frac{17}{18}$
g.	$6\frac{5}{9} + 4\frac{16}{18} - 3\frac{5}{6}$	$5\frac{17}{18} + 3\frac{8}{9} - 4\frac{10}{12}$	$14\frac{14}{15} + 6\frac{8}{5} - 8\frac{2}{3}$	$28\frac{11}{36} + 8\frac{3}{4} - 5\frac{13}{18}$

Written Exercises.

1. $\frac{1}{15}+\frac{17}{20}+1\frac{7}{30}$.
2. $2\frac{5}{8}+\frac{4}{5}+\frac{13}{15}$.
3. $\frac{5}{6}+1\frac{1}{12}+\frac{9}{14}$.
4. $\frac{8}{9}+\frac{11}{12}+\frac{25}{36}$.
5. $\frac{9}{16}+4\frac{3}{10}+\frac{37}{40}$.
6. $\frac{7}{24}+\frac{4}{5}+\frac{11}{12}$.
7. $\frac{7}{12}+\frac{9}{14}+\frac{19}{28}$.
8. $\frac{3}{11}+\frac{5}{6}+\frac{7}{8}$.
9. $\frac{17}{60}+\frac{7}{48}+\frac{5}{24}$.
10. $\frac{4}{15}+\frac{5}{27}+\frac{4}{5}$.
11. $\frac{7}{16}+\frac{4}{7}+\frac{17}{28}$.
12. $\frac{49}{50}+\frac{7}{16}+\frac{67}{80}$.
13. $\frac{23}{32}+\frac{17}{40}+\frac{9}{16}$.
14. $23\frac{5}{16}+17\frac{2}{3}+6\frac{9}{10}+8\frac{7}{30}$.
15. $3\frac{4}{9}+\frac{5}{8}+17\frac{5}{6}+\frac{5}{72}$.
16. $24\frac{13}{24}+7\frac{9}{12}+40\frac{5}{9}+\frac{1}{6}$.
17. $127\frac{7}{9}+29\frac{3}{4}+38\frac{4}{5}+\frac{13}{18}$.
18. $33\frac{14}{25}+9\frac{7}{25}+8\frac{1}{8}+\frac{9}{16}$.
19. $246\frac{3}{10}+112\frac{3}{4}+14\frac{7}{8}+9\frac{11}{15}$.
20. $\frac{9}{22}+2\frac{11}{40}+296\frac{3}{5}+\frac{7}{8}$.
21. $467\frac{7}{9}+\frac{29}{45}+206\frac{13}{25}+\frac{4}{5}$.
22. $\frac{27}{35}+106\frac{7}{12}+9\frac{5}{8}+76\frac{5}{6}$.
23. $42\frac{7}{8}+50\frac{5}{9}+19\frac{4}{11}+64$.
24. $\frac{13}{21}+4\frac{6}{11}+49\frac{2}{3}+\frac{6}{7}$.
25. $19\frac{5}{17}+4\frac{29}{51}+16\frac{2}{3}+8\frac{1}{3}$.
26. $\frac{54}{63}+\frac{11}{27}+9\frac{2}{3}+8\frac{6}{7}$.
27. $\frac{29}{144}+1\frac{55}{72}+\frac{31}{36}+7\frac{41}{48}$.

28.	29.	30.	31.
$\frac{18}{40}-\frac{1}{10}$	$\frac{14}{15}-\frac{5}{7}$	$\frac{11}{36}-\frac{13}{84}$	$\frac{24}{78}-\frac{2}{15}$
$\frac{7}{8}-\frac{3}{32}$	$\frac{17}{19}-\frac{11}{16}$	$\frac{25}{36}-\frac{11}{64}$	$\frac{45}{84}-\frac{7}{22}$
$\frac{3}{4}-\frac{9}{17}$	$\frac{25}{26}-\frac{3}{14}$	$\frac{57}{90}-\frac{6}{14}$	$\frac{48}{80}-\frac{7}{16}$

32.	33.	34.	35.
$14\frac{8}{29}-\frac{13}{29}$	$200-\frac{26}{87}$	$14-2\frac{7}{25}$	$124-91\frac{4}{17}$
$25-\frac{7}{45}$	$110-\frac{57}{85}$	$19-4\frac{6}{11}$	$205-40\frac{28}{30}$
$40-\frac{48}{80}$	$24-6\frac{2}{79}$	$27-19\frac{45}{73}$	$316-294\frac{7}{45}$

36.	37.	38.	39.
$24\frac{4}{5}-\frac{7}{15}$	$501\frac{2}{13}-\frac{6}{7}$	$21\frac{11}{24}-\frac{5}{16}$	$18\frac{3}{4}-\frac{7}{15}$
$46\frac{15}{22}-\frac{9}{11}$	$100\frac{25}{32}-\frac{7}{8}$	$67\frac{19}{40}-\frac{11}{18}$	$12\frac{9}{32}-\frac{23}{24}$
$9\frac{5}{18}-\frac{11}{12}$	$194\frac{18}{27}-\frac{8}{9}$	$43\frac{2}{15}-\frac{8}{27}$	$10\frac{14}{35}-\frac{42}{105}$

40.	41.	42.	43.
$19\frac{4}{7}-5\frac{7}{35}$	$54\frac{3}{4}-19\frac{9}{25}$	$124\frac{5}{18}-90\frac{2}{8}$	$55\frac{3}{4}-44\frac{2}{7}$
$21\frac{9}{16}-4\frac{7}{42}$	$278\frac{3}{8}-20\frac{2}{3}$	$200\frac{2}{7}-90\frac{17}{18}$	$96\frac{7}{8}-94\frac{9}{10}$
$8\frac{5}{11}-7\frac{5}{6}$	$392\frac{3}{4}-28\frac{11}{15}$	$101\frac{25}{42}-98\frac{4}{7}$	$87\frac{5}{12}-40\frac{9}{10}$
$42\frac{4}{19}-16\frac{3}{4}$	$491\frac{1}{16}-7\frac{23}{24}$	$100\frac{36}{49}-99\frac{8}{7}$	$218\frac{5}{7}-23\frac{7}{18}$

1. $19\frac{4}{7} + 6\frac{9}{11} + 4\frac{1}{2}$.
2. $4\frac{8}{15} + 1\frac{2}{40} + 80\frac{3}{8}$.
3. $24\frac{8}{8} - 16\frac{3}{4} + 1\frac{7}{12}$.
4. $29\frac{5}{14} + 17\frac{8}{21} - 40\frac{11}{14}$.
5. $140 - 38\frac{15}{25} + 6\frac{2}{3}$.
6. $98\frac{1}{16} - 97\frac{37}{48} + 1\frac{3}{12}$.
7. $1 - \frac{25}{27} + \frac{2}{3} - \frac{1}{6}$.
8. $217 - \frac{12}{21} - 190\frac{5}{7}$.
9. $28\frac{16}{35} + 13\frac{11}{14} - 9\frac{9}{7} + 20\frac{13}{18}$.
10. $4\frac{5}{8} + 16\frac{13}{18} - 17\frac{8}{9} - \frac{1}{2}$.
11. $1\frac{4}{39} - \frac{8}{65} + 19\frac{4}{13} - 4\frac{7}{8}$.
12. $41\frac{2}{3} - 8\frac{7}{9} - 9\frac{18}{33} - 8\frac{7}{9}$.
13. $10 - 9\frac{19}{40} + 16\frac{5}{8} - 15\frac{1}{2}$.
14. $24\frac{8}{35} - \frac{9}{40} + 6\frac{1}{2} + \frac{48}{70}$.
15. $16\frac{5}{8} - 7\frac{11}{24} + 20 - 4\frac{5}{6}$.
16. $10\frac{1}{8} + \frac{15}{32} - 9\frac{9}{16} + 70\frac{8}{8}$.

---

17. $49\frac{2}{8} - (8\frac{3}{8} + 5\frac{7}{15})$.
18. $87\frac{9}{16} - (9\frac{4}{11} - 7\frac{5}{6})$.
19. $26\frac{5}{9} + 9\frac{1}{18} - (4\frac{2}{3} + 5\frac{3}{4} - 2\frac{5}{6})$.
20. $78\frac{3}{5} - (14\frac{1}{2} + 9\frac{3}{8} + 7\frac{1}{6}) + 9\frac{5}{8}$.
21. $9 - (\frac{7}{8} + 4\frac{2}{5}) + (14\frac{1}{12} + 20\frac{7}{15})$.
22. $(17\frac{19}{63} - 9\frac{3}{4}) + 216\frac{39}{84}$.
23. $14\frac{9}{16} + 7\frac{3}{7} - 20\frac{3}{4}$.
24. $51\frac{6}{13} - 42\frac{5}{8} + 9\frac{19}{26}$.
25. $19 - (2\frac{8}{15} + 3\frac{31}{42} + 12\frac{7}{18}.)$
26. $4\frac{7}{5} + (19\frac{19}{21} - 7\frac{11}{18} + 9\frac{1}{30})$.

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*
1.	$\frac{5}{24}$	$\frac{19}{48}$	$\frac{23}{36}$	$4\frac{7}{96}$	$8\frac{19}{108}$	$28\frac{37}{144}$	$69\frac{5}{84}$	$86\frac{13}{240}$
2.	$\frac{7}{18}$	$\frac{41}{63}$	$\frac{98}{126}$	$18\frac{11}{90}$	$21\frac{16}{108}$	$30\frac{17}{198}$	$89\frac{19}{144}$	$94\frac{17}{315}$
3.	$\frac{4}{15}$	$\frac{17}{90}$	$\frac{83}{120}$	$6\frac{21}{135}$	$18\frac{74}{105}$	$28\frac{173}{240}$	$48\frac{28}{165}$	$82\frac{65}{144}$
4.	$\frac{11}{91}$	$\frac{17}{21}$	$\frac{59}{63}$	$3\frac{130}{170}$	$19\frac{48}{110}$	$52\frac{237}{338}$	$68\frac{41}{161}$	$78\frac{64}{105}$
5.	$\frac{7}{120}$	$\frac{48}{88}$	$\frac{96}{144}$	$8\frac{27}{243}$	$11\frac{34}{102}$	$46\frac{42}{294}$	$58\frac{37}{232}$	$63\frac{84}{216}$
6.	$\frac{3}{40}$	$\frac{29}{56}$	$\frac{83}{88}$	$4\frac{17}{104}$	$18\frac{28}{168}$	$32\frac{51}{136}$	$48\frac{124}{224}$	$69\frac{99}{120}$
7.	$\frac{19}{84}$	$\frac{77}{108}$	$\frac{35}{36}$	$6\frac{15}{180}$	$26\frac{71}{144}$	$30\frac{180}{216}$	$58\frac{127}{204}$	$86\frac{96}{121}$
8.	$\frac{17}{121}$	$\frac{68}{143}$	$\frac{81}{88}$	$8\frac{15}{33}$	$19\frac{185}{352}$	$21\frac{140}{187}$	$80\frac{174}{253}$	$98\frac{78}{176}$

27. $a+b$	35. $b+e$	43. $d+e$	51. $b-a$	59. $f-b$
28. $a+c$	36. $b+f$	44. $d+f$	52. $c-b$	60. $f-c$
29. $a+d$	37. $b+g$	45. $d+g$	53. $c-a$	61. $f-d$
30. $a+e$	38. $c+d$	46. $e+f$	54. $d-b$	62. $f-e$
31. $a+f$	39. $c+e$	47. $e+g$	55. $d-c$	63. $g-d$
32. $a+g$	40. $c+f$	48. $f+g$	56. $e-a$	64. $g-e$
33. $b+c$	41. $c+g$	49. $f+h$	57. $e-c$	65. $h-e$
34. $b+d$	42. $c+h$	50. $g+h$	58. $e-d$	66. $h-g$

Oral and Written Exercises.

1 Henry Wood has three wheat-fields. The first contains $84\frac{5}{8}$ acres, the second $70\frac{3}{4}$ acres, and the third $109\frac{1}{12}$ acres. How many acres in all?

2. Last year the first field produced $947\frac{3}{11}$ bushels, the second $800\frac{6}{7}$ bushels, and the third $1406\frac{5}{8}$ bushels. How many bushels of wheat were produced?

3. A man having a farm of $960\frac{4}{11}$ acres sold at one time $136\frac{1}{2}$ acres, and at another time $240\frac{3}{4}$ acres. How many acres remained?

4. Ned bought a knife for $87\frac{1}{2}$¢, and a fountain pen for $\$1.37\frac{1}{2}$; he sold both for $3. How much did he gain?

5. A farm was bought for $\$6070\frac{3}{8}$, and sold at a loss of $\$1900\frac{1}{12}$. What was the selling price?

6. Mr. Burtis bought a carriage for $\$529\frac{1}{15}$; he sold it so as to gain $\$96\frac{3}{4}$. How much did he receive for the carriage?

7. Harry has $\$56\frac{5}{8}$; Clare has $\$29\frac{3}{4}$ more than Harry. How much money have both together?

8. A man earned $\$89\frac{7}{5}$. He paid bills amounting to $\$37\frac{1}{2}$, and deposited in the bank $\$25\frac{3}{4}$. How much money did he then have?

9. Last fall, Mr. Hilton put $46\frac{3}{7}$ tons of coal into his cellar; in the spring $2\frac{5}{8}$ tons were left. How much had been used during the winter?

10. A lady paid $\$1\frac{7}{8}$ for a pair of gloves, $\$3\frac{1}{4}$ for an umbrella, and $\$29\frac{7}{20}$ for dress materials. How much change should she receive for four ten-dollar bills?

11. From a piece of wire netting containing $67\frac{5}{16}$ yd. there were sold four strips; the first measured 19 ft., the second 32 ft., the third $24\frac{1}{8}$ yd., and the fourth 57 ft. How much netting left?

12. How many feet of barbed wire will be required to go once around a field that is $194\frac{5}{7}$ ft. long and $84\frac{1}{8}$ ft. wide?

13. Helen earned $\$1\frac{1}{5}$ in a week, and spent $\$\frac{3}{4}$. The next week she earned $\$2\frac{1}{8}$, and spent $\$1\frac{5}{8}$. How much money had she at the end of the second week?

14. I spend $\frac{5}{6}$ and $\frac{1}{12}$ of my money, and give away $\frac{1}{24}$. How much remains?

1. $19\frac{4}{7} + 6\frac{9}{11} + 4\frac{1}{2}$.
2. $4\frac{8}{15} + \frac{1}{40} + 80\frac{3}{5}$.
3. $24\frac{8}{8} - 16\frac{3}{4} + \frac{7}{12}$.
4. $29\frac{5}{14} + 17\frac{8}{21} - 40\frac{11}{14}$.
5. $140 - 38\frac{15}{29} + 6\frac{2}{3}$.
6. $98\frac{1}{16} - 97\frac{37}{48} + \frac{3}{12}$.
7. $1 - \frac{25}{27} + \frac{2}{3} - \frac{1}{9}$.
8. $217 - \frac{12}{21} - 190\frac{5}{7}$.
9. $28\frac{16}{33} + 13\frac{11}{14} - 9\frac{8}{9} + 20\frac{13}{18}$.
10. $4\frac{5}{8} + 16\frac{13}{15} - 17\frac{8}{9} - \frac{1}{2}$.
11. $1\frac{4}{39} - \frac{8}{65} + 19\frac{4}{13} - 4\frac{7}{8}$.
12. $41\frac{2}{3} - 8\frac{7}{9} - 9\frac{18}{22} - 8\frac{7}{9}$.
13. $10 - 9\frac{19}{40} + 16\frac{5}{8} - 15\frac{1}{4}$.
14. $24\frac{8}{35} - \frac{9}{40} + 6\frac{1}{2} + \frac{48}{70}$.
15. $16\frac{5}{8} - 7\frac{11}{24} + 20 - 4\frac{5}{8}$.
16. $10\frac{1}{8} + \frac{15}{32} - 9\frac{9}{16} + 70\frac{8}{8}$.

---

17. $49\frac{3}{8} - (8\frac{3}{5} + 5\frac{7}{15})$.
18. $87\frac{9}{16} - (9\frac{4}{11} - 7\frac{5}{9})$.
19. $26\frac{5}{9} + 9\frac{11}{18} - (4\frac{2}{3} + 5\frac{3}{4} - 2\frac{5}{6})$.
20. $78\frac{3}{8} - (14\frac{1}{2} + 9\frac{3}{8} + 7\frac{1}{6}) + 9\frac{5}{8}$.
21. $9 - (\frac{7}{8} + 4\frac{2}{9}) + (14\frac{11}{12} + 20\frac{17}{18})$.
22. $(17\frac{48}{52} - - 9\frac{3}{4}) + 216\frac{29}{31}$.
23. $14\frac{9}{16} + 7\frac{3}{7} - 20\frac{3}{4}$.
24. $51\frac{6}{13} - 42\frac{25}{8} + 9\frac{19}{26}$.
25. $19 - (2\frac{8}{15} + 3\frac{31}{42} + 12\frac{7}{15}.)$
26. $4\frac{7}{9} + (19\frac{19}{21} - 7\frac{11}{18} + 9\frac{1}{30})$.

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*
1.	$\frac{5}{24}$	$\frac{19}{48}$	$\frac{23}{36}$	$4\frac{7}{56}$	$8\frac{19}{108}$	$28\frac{37}{144}$	$69\frac{5}{84}$	$86\frac{12}{240}$
2.	$\frac{7}{18}$	$\frac{41}{63}$	$\frac{98}{126}$	$18\frac{11}{90}$	$21\frac{16}{108}$	$30\frac{17}{198}$	$89\frac{19}{144}$	$94\frac{17}{315}$
3.	$\frac{4}{15}$	$\frac{17}{90}$	$\frac{83}{120}$	$6\frac{21}{135}$	$18\frac{74}{105}$	$28\frac{173}{240}$	$48\frac{28}{165}$	$82\frac{65}{144}$
4.	$\frac{11}{91}$	$\frac{17}{21}$	$\frac{59}{63}$	$31\frac{30}{170}$	$19\frac{48}{115}$	$52\frac{27}{98}$	$68\frac{41}{161}$	$78\frac{64}{105}$
5.	$\frac{7}{120}$	$\frac{48}{96}$	$\frac{96}{144}$	$8\frac{27}{243}$	$11\frac{34}{102}$	$46\frac{42}{294}$	$58\frac{37}{222}$	$63\frac{64}{216}$
6.	$\frac{3}{40}$	$\frac{29}{56}$	$\frac{83}{88}$	$4\frac{117}{104}$	$18\frac{28}{168}$	$32\frac{51}{136}$	$48\frac{125}{224}$	$69\frac{99}{120}$
7.	$\frac{19}{84}$	$\frac{77}{108}$	$\frac{36}{36}$	$6\frac{116}{180}$	$26\frac{71}{144}$	$30\frac{180}{216}$	$58\frac{127}{204}$	$86\frac{96}{121}$
8.	$\frac{17}{121}$	$\frac{68}{143}$	$\frac{81}{88}$	$8\frac{15}{33}$	$19\frac{165}{352}$	$21\frac{140}{187}$	$80\frac{174}{253}$	$98\frac{78}{176}$

27. $a+b$	35. $b+e$	43. $d+e$	51. $b-a$	59. $f-b$
28. $a+c$	36. $b+f$	44. $d+f$	52. $c-b$	60. $f-c$
29. $a+d$	37. $b+g$	45. $d+g$	53. $c-a$	61. $f-d$
30. $a+e$	38. $c+d$	46. $e+f$	54. $d-b$	62. $f-e$
31. $a+f$	39. $c+e$	47. $e+g$	55. $d-c$	63. $g-d$
32. $a+g$	40. $c+f$	48. $f+g$	56. $e-a$	64. $g-e$
33. $b+c$	41. $c+g$	49. $f+h$	57. $e-c$	65. $h-e$
34. $b+d$	42. $c+h$	50. $g+h$	58. $e-d$	66. $h-g$

Oral and Written Exercises.

1 Henry Wood has three wheat-fields. The first contains $84\frac{3}{8}$ acres, the second $70\frac{2}{3}$ acres, and the third $109\frac{1}{12}$ acres. How many acres in all?

2. Last year the first field produced $947\frac{3}{14}$ bushels, the second $800\frac{6}{7}$ bushels, and the third $1406\frac{5}{8}$ bushels. How many bushels of wheat were produced?

3. A man having a farm of $960\frac{4}{11}$ acres sold at one time $136\frac{1}{2}$ acres, and at another time $240\frac{3}{4}$ acres. How many acres remained?

4. Ned bought a knife for $87\frac{1}{2}$¢, and a fountain pen for $\$1.37\frac{1}{2}$; he sold both for $3. How much did he gain?

5. A farm was bought for $\$6070\frac{3}{8}$, and sold at a loss of $\$1900\frac{1}{12}$. What was the selling price?

6. Mr. Burtis bought a carriage for $\$529\frac{1}{6}$; he sold it so as to gain $\$96\frac{3}{4}$. How much did he receive for the carriage?

7. Harry has $\$56\frac{5}{8}$; Clare has $\$29\frac{3}{4}$ more than Harry. How much money have both together?

8. A man earned $\$89\frac{7}{9}$. He paid bills amounting to $\$37\frac{1}{2}$, and deposited in the bank $\$25\frac{3}{4}$. How much money did he then have?

9. Last fall, Mr. Hilton put $46\frac{3}{7}$ tons of coal into his cellar; in the spring $2\frac{5}{8}$ tons were left. How much had been used during the winter?

10. A lady paid $\$1\frac{7}{8}$ for a pair of gloves, $\$3\frac{1}{3}$ for an umbrella, and $\$29\frac{7}{20}$ for dress materials. How much change should she receive for four ten-dollar bills?

11. From a piece of wire netting containing $67\frac{5}{16}$ yd. there were sold four strips; the first measured 19 ft., the second 32 ft., the third $24\frac{1}{8}$ yd., and the fourth 57 ft. How much netting left?

12. How many feet of barbed wire will be required to go once around a field that is $194\frac{5}{7}$ ft. long and $84\frac{1}{6}$ ft. wide?

13. Helen earned $\$1\frac{1}{5}$ in a week, and spent $\$\frac{3}{4}$. The next week she earned $\$2\frac{1}{8}$, and spent $\$1\frac{5}{6}$. How much money had she at the end of the second week?

14. I spend $\frac{5}{6}$ and $\frac{1}{12}$ of my money, and give away $\frac{1}{24}$. How much remains?

1. $\frac{1}{7}$ of a pole was broken off by the wind, $\frac{1}{8}$ of it was in the mud, and the remainder was in the air. What part of it was in the air?

2. I bought a barrel of sugar weighing $217\frac{3}{16}$ lb. The weight of the barrel alone was $23\frac{1}{4}$ lb. How much did the sugar weigh?

3. Albert spends $\frac{5}{12}$ of his time in school; $\frac{3}{7}$ of his time is given to work. What part of his time is given to other things?

4. Mr. Nickerson has a bin that will hold 100 bu. of corn. He put in at different times $16\frac{5}{8}$ bu., $25\frac{3}{4}$ bu., and $49\frac{1}{16}$ bu. After selling 127 pk., how much corn could then be put into the bin?

5. George and Harry start at the school-house and walk in opposite directions. George walks $4\frac{7}{8}$ mi., while Harry walks $3\frac{1}{32}$ mi. How far apart are they then?

6. A train reached Boston at 12 o'clock. It had made the trip from New York in $6\frac{3}{4}$ hours. At what time did it leave New York?

7. A thermometer showed at noon $78\frac{1}{4}$ degrees above zero. At 6 o'clock P.M. it showed $45\frac{3}{7}$ degrees. How much had it fallen?

8. In a piece of rope there were $46\frac{7}{8}$ yd. After selling a certain amount, the piece of rope measured $16\frac{3}{4}$ yd. How much had been sold?

9. A piece of linen measured $59\frac{7}{8}$ yd. After being washed, it measured only $57\frac{6}{7}$ yd. How much had it shrunk?

10. I paid \$29$\frac{3}{8}$ for coal, \$6$\frac{3}{4}$ for flour, \$1$\frac{7}{8}$ for butter, and \$3$\frac{5}{8}$ for sugar. How much change is due me from \$50?

11. If it is $141\frac{3}{4}$ miles in a straight line from Boston to Albany, and $476\frac{8}{15}$ miles from Albany to Detroit, how many miles from Boston to Detroit?

12. A man bought some wheat for \$34$\frac{8}{9}$, and some corn for \$23$\frac{3}{4}$. If he paid \$42$\frac{1}{2}$ down, how much remains to be paid?

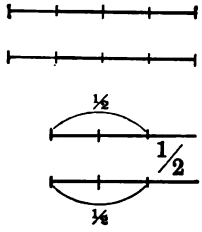
13. If a cubic foot of gold weighs $1203\frac{3}{5}$ lb., and a cubic foot of silver weighs $625\frac{3}{4}$ lb., how much more does a cubic foot of gold weigh than the same quantity of silver?

14. In a pound of wheat there are $2\frac{3}{8}\frac{1}{7}\frac{2}{8}$ grains of water, $2\frac{1}{3}\frac{4}{2}\frac{4}{5}$ grains of gluten, and $9\frac{4}{8}\frac{8}{7}\frac{4}{8}$ grains of starch. How many grains of other substances are there in a pound of wheat? (7000 gr. = 1 lb.)

SECTION III.

COMMON FRACTIONS, COMPLETED.

Oral Exercises.



$\frac{3}{4}$ in. $\times 2 = \frac{6}{4}$ in. $= 1\frac{2}{4}$ in. $= 1\frac{1}{2}$ in.

$\frac{3}{4}$ in $\times 2 = \frac{3}{2}$ in. $= 1\frac{1}{2}$ in.

Here are two ways of multiplying $\frac{3}{4}$ of an inch by 2.

1. What can you say of the size of parts and number of parts obtained in the two ways?

2. In the same ways, by means of lines, multiply $\frac{2}{3}$ by 3; $\frac{5}{6}$ by 2.

3. In what two ways can you multiply a fraction by a whole number?

Multiply:

	4.	5.	6.	7.	8.
a.	$\frac{1}{9} \times 3$	$\frac{7}{10} \times 5$	$\frac{7}{9} \times 3$	$1\frac{1}{12} \times 6$	$1\frac{1}{8} \times 6$
b.	$\frac{2}{3} \times 3$	$\frac{5}{12} \times 6$	$\frac{5}{8} \times 4$	$1\frac{1}{12} \times 9$	$\frac{1}{2} \times 9$
c.	$\frac{3}{4} \times 4$	$1\frac{1}{15} \times 5$	$\frac{5}{8} \times 8$	$\frac{5}{18} \times 9$	$\frac{3}{4} \times 8$
d.	$\frac{7}{8} \times 4$	$1\frac{5}{6} \times 2$	$\frac{5}{8} \times 9$	$\frac{6}{7} \times 8$	$\frac{8}{8} \times 8$
e.	$\frac{8}{9} \times 3$	$1\frac{5}{6} \times 3$	$\frac{3}{10} \times 7$	$1\frac{1}{8} \times 8$	$\frac{7}{8} \times 10$

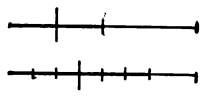
	9.	10.	11.	12.
a.	$3\frac{3}{8} \times 2$	$1\frac{3}{4} \times 4$	$1\frac{7}{8} \times 4$	$1\frac{3}{5} \times 6$
b.	$2\frac{5}{9} \times 3$	$4\frac{7}{8} \times 8$	$2\frac{3}{4} \times 3$	$1\frac{6}{8} \times 9$
c.	$1\frac{5}{12} \times 2$	$3\frac{5}{6} \times 6$	$3\frac{1}{2} \times 6$	$2\frac{3}{14} \times 7$
d.	$4\frac{5}{6} \times 3$	$1\frac{2}{3} \times 6$	$1\frac{4}{5} \times 2$	$3\frac{3}{12} \times 10$
e.	$1\frac{1}{10} \times 5$	$1\frac{3}{4} \times 8$	$1\frac{5}{8} \times 3$	$4\frac{6}{7} \times 5$

$\frac{1}{4}$ of 2 in. = $\frac{2}{4}$ in. = $\frac{1}{2}$ in.

$\frac{3}{4}$ of 2 in. = $\frac{6}{4}$ in. = $1\frac{1}{2}$ in.

By the aid of lines find :

1. $\frac{1}{4}$ of 3 in.; $\frac{1}{8}$ of 2 in.; $\frac{1}{6}$ of 4 in.; $\frac{1}{8}$ of 2 in.
2. 4 in. $\times \frac{1}{6}$; 3 in. $\times \frac{1}{4}$; 4 in $\times \frac{1}{8}$; 3 in. $\times \frac{1}{4}$.
3. $\frac{2}{3}$ of 3 in.; $\frac{3}{4}$ of 4 in.; $\frac{3}{4}$ of 8 in.; $\frac{5}{6}$ of 6 in.
4. $\frac{2}{8}$ of 2 in.; $\frac{2}{4}$ of 2 in.; $\frac{3}{4}$ of 3 in.; $\frac{5}{6}$ of 2 in.



$\frac{1}{2}$ of $\frac{1}{2}$ in. = $\frac{1}{4}$ in.

$\frac{1}{2}$ of $\frac{3}{4}$ in. = $\frac{1}{8}$ in.

By the aid of lines find :

5. $\frac{1}{2}$ of $\frac{2}{3}$ in.; $\frac{1}{8}$ of $\frac{3}{4}$ in.; $\frac{1}{2}$ of $1\frac{1}{2}$ in.; $\frac{1}{2}$ of $2\frac{1}{2}$ in.
6. $\frac{1}{4}$ of $3\frac{1}{2}$ in.; $\frac{1}{8}$ of $2\frac{1}{2}$ in.; $\frac{1}{2}$ of $1\frac{1}{4}$ in.; $\frac{1}{4}$ of $2\frac{1}{2}$ in.

7.	8.	9.	10.	11.
$4\frac{1}{2} \times 6$	$8\frac{5}{6} \times 12$	$3\frac{9}{10} \times 5$	$\frac{3}{11}$ of 26	$8 \times 3\frac{4}{5}$
$12\frac{3}{4} \times 3$	$9\frac{1}{5} \times 10$	$8\frac{5}{12} \times 9$	$\frac{4}{5}$ of 38	$9 \times 5\frac{3}{7}$
$\frac{3}{4} \times 16$	$3\frac{2}{3} \times 4$	$6\frac{5}{8} \times 10$	$\frac{6}{7}$ of 40	$5 \times 8\frac{4}{5}$
$1\frac{1}{2} \times 12$	$5\frac{1}{3} \times 6$	$7\frac{4}{7} \times 11$	$\frac{2}{5}$ of 52	$7 \times 2\frac{1}{12}$
$2\frac{2}{3} \times 9$	$2\frac{3}{4} \times 3$	$\frac{2}{3}$ of 8	$\frac{2}{3}$ of 68	$6 \times 5\frac{5}{8}$
$7\frac{1}{4} \times 8$	$3\frac{5}{8} \times 2$	$\frac{4}{5}$ of 9	$\frac{3}{4}$ of 46	$9 \times 3\frac{7}{12}$

12.	13.	14.	15.	16.
$\frac{1}{2}$ of $\frac{2}{3}$	$\frac{2}{3}$ of $\frac{4}{5}$	$\frac{6}{9}$ of $1\frac{1}{2}$	$\frac{5}{6}$ of $3\frac{3}{4}$	$3\frac{3}{4} \times 1\frac{2}{3}$
$\frac{1}{3}$ of $\frac{3}{4}$	$\frac{4}{5}$ of $\frac{2}{3}$	$\frac{3}{10}$ of $1\frac{2}{3}$	$\frac{8}{8}$ of $1\frac{4}{5}$	$1\frac{8}{8} \times 2\frac{3}{4}$
$\frac{2}{3}$ of $\frac{3}{4}$	$\frac{7}{8}$ of $\frac{1}{2}$	$\frac{1}{8}$ of $3\frac{1}{2}$	$\frac{3}{4}$ of $4\frac{1}{2}$	$1\frac{4}{5} \times 3\frac{1}{2}$
$\frac{3}{4}$ of $\frac{4}{5}$	$\frac{4}{5}$ of $\frac{3}{4}$	$\frac{2}{4}$ of $1\frac{1}{2}$	$\frac{2}{4}$ of $5\frac{1}{2}$	$6\frac{1}{8} \times 4\frac{1}{8}$
$\frac{1}{3}$ of $\frac{1}{2}$	$\frac{2}{3}$ of $\frac{6}{6}$	$\frac{2}{3}$ of $2\frac{1}{2}$	$\frac{3}{4}$ of $9\frac{1}{3}$	$4\frac{3}{4} \times 1\frac{5}{8}$
$\frac{3}{4}$ of $\frac{1}{2}$	$\frac{3}{7}$ of $\frac{2}{3}$	$\frac{4}{5}$ of $3\frac{1}{3}$	$1\frac{2}{3} \times 2\frac{1}{2}$	$2\frac{7}{8} \times 4\frac{2}{3}$
$\frac{1}{3}$ of $\frac{1}{3}$	$\frac{4}{9}$ of $\frac{2}{3}$	$\frac{3}{7}$ of $4\frac{1}{2}$	$2\frac{1}{2} \times 1\frac{3}{4}$	$5\frac{1}{8} \times 6\frac{3}{4}$

1. At $\$\frac{5}{8}$ a yd. what will 3 yd. of cloth cost? 9 yd.?

2. If a boy earns $\$1\frac{1}{2}$ in a week, how much can he earn in 12 weeks? in 17 weeks?

3. Harry picks $12\frac{1}{4}$ qt. of berries a day. How many can he pick in 3 days? in a week?

4. Ralph travels $4\frac{3}{8}$ mi. an hour on his bicycle. How far can he travel in 9 hours?

5. A boy makes $1\frac{1}{2}¢$ in selling a paper. How much does he make in selling 5 dozen papers? 100 papers?

6. At $6\frac{1}{2}¢$ a qt., what will a gallon of milk cost?

7. At $1\frac{3}{4}¢$ a mile, what will a hundred-mile ticket cost?

8. Coal costs $\$3\frac{3}{4}$ a ton. What must I pay for 9 tons? for $\frac{1}{2}$ ton?

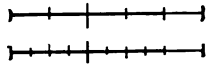
9. A tailor uses $2\frac{1}{2}$ yd. of cloth for a boy's suit. How much cloth is required for 15 suits?

10. Willie buys a dozen marbles at $1\frac{1}{8}¢$ apiece. Cost?

11.	12.
1 hat costs $\$2\frac{3}{7}$.	1 lead-pencil costs $4\frac{3}{5}¢$.
9 hats cost?	1 doz. lead-pencils cost?

13.	14.
1 doz. eggs cost $25\frac{1}{2}¢$.	1 lb. sugar costs $6\frac{3}{4}¢$.
9 doz. eggs cost?	$9\frac{1}{2}$ lb. sugar cost?

Here are two ways of dividing $\frac{4}{5}$ in. by 2:



$\frac{4}{5}$ in. $\div 2 = \frac{?}{5}$.

$\frac{4}{5}$ in. $\div 2 = \frac{?}{10} = \frac{?}{5}$.

15. What can you say of the size of the parts in the first process? What of the number of parts? What can you say of the size and number of parts in the second process?

16. In what two ways can you divide a fraction by a whole number?

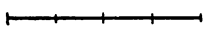
By means of lines, squares, or disks find:

17. $\frac{3}{4} \div 3$; $\frac{4}{8} \div 2$; $\frac{2}{4} \div 2$; $\frac{4}{5} \div 4$; $\frac{8}{9} \div 4$; $1\frac{2}{15} \div 6$.

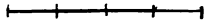
18. $\frac{2}{3} \div 4$; $\frac{3}{4} \div 4$; $\frac{3}{8} \div 2$; $\frac{7}{8} \div 2$; $\frac{8}{5} \div 3$; $\frac{8}{6} \div 4$.

1. In dividing a fraction by a whole number, when will you divide the numerator? When will you multiply the denominator?

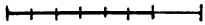
2.	3.	4.	5.	6.
$\frac{1}{2} \div 4$	$\frac{8}{8} \div 4$	$\frac{4}{5} \div 6$	$1\frac{2}{3} \div 6$	$2\frac{1}{2} \div 5$
$\frac{8}{8} \div 3$	$\frac{5}{6} \div 3$	$1\frac{1}{2} \div 4$	$1\frac{3}{4} \div 7$	$2\frac{1}{2} \div 6$
$\frac{6}{9} \div 3$	$\frac{7}{8} \div 2$	$1\frac{1}{2} \div 3$	$1\frac{3}{4} \div 6$	$3\frac{3}{4} \div 3$
$\frac{5}{8} \div 2$	$\frac{8}{9} \div 4$	$1\frac{1}{2} \div 6$	$1\frac{8}{8} \div 11$	$3\frac{3}{4} \div 5$
$\frac{5}{8} \div 5$	$\frac{8}{9} \div 3$	$1\frac{8}{8} \div 5$	$1\frac{8}{8} \div 8$	$3\frac{3}{4} \div 6$



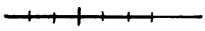
7. $\frac{1}{4}$ of an inch is contained in 1 in. how many times? $1 \div \frac{1}{4} = ?$



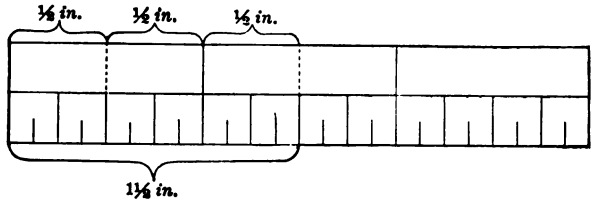
8. $\frac{1}{4}$ of an inch is contained in $\frac{3}{4}$ in. how many times? $\frac{3}{4} \div \frac{1}{4} = ?$



9. $\frac{1}{8}$ of an inch is contained in $\frac{3}{4}$ in. how many times? $\frac{3}{4} \div \frac{1}{8} = ?$



10. $\frac{8}{8}$ of an inch is contained in $\frac{3}{4}$ in. how many times? $\frac{3}{4} \div \frac{8}{8} = ?$



11. 1 in. is what part of 3 in.? $1 \div 3 = ?$
12. $\frac{1}{2}$ in. is what part of $1\frac{1}{2}$ in.? $\frac{1}{2} \div 1\frac{1}{2} = ?$
13. 1 in. is what part of $1\frac{1}{2}$ in.? $1 \div 1\frac{1}{2} = ?$

Perform by diagrams the following:

14. $\frac{1}{2}$ in. is what part of 2 in.? $\frac{1}{2} \div 2 = ?$
15. $\frac{1}{2}$ in. is what part of 3 in.? $\frac{1}{2} \div 3 = ?$
16. $\frac{1}{2}$ in. is what part of $2\frac{1}{2}$ in.? $\frac{1}{2} \div 2\frac{1}{2} = ?$
17. $\frac{3}{4}$ in. is what part of 2 in.? $\frac{3}{4} \div 2 = ?$
18. $\frac{3}{4}$ in. is what part of $1\frac{1}{2}$ in.? $\frac{3}{4} \div 1\frac{1}{2} = ?$
19. $\frac{3}{4}$ in. is what part of $2\frac{1}{2}$ in.? $\frac{3}{4} \div 2\frac{1}{2} = ?$

1. $1\frac{1}{2}$ in. is what part of 3 in.? $1\frac{1}{2} \div 3 = ?$
2. $1\frac{1}{2}$ in. is what part of $2\frac{1}{2}$ in.? $1\frac{1}{2} \div 2\frac{1}{2} = ?$
3. $2 \div \frac{1}{4} = ?$ $2 \div \frac{3}{4} = ?$ $2 \div \frac{2}{3} = ?$
4. $3 \div \frac{1}{3} = ?$ $3 \div \frac{2}{3} = ?$ $3 \div \frac{3}{4} = ?$
5. $\frac{1}{2} \div \frac{1}{4} = ?$ $\frac{1}{2} \div \frac{3}{4} = ?$ $\frac{1}{2} \div \frac{2}{3} = ?$
6. $\frac{3}{4} \div \frac{1}{3} = ?$ $\frac{3}{4} \div \frac{1}{3} = ?$ $\frac{3}{4} \div \frac{5}{6} = ?$

7. Dividing a number by a fraction is the same as multiplying this number by what?

8.	9.	10.	11.	12.
$\frac{1}{4}$ of $\frac{4}{7}$	$\frac{1}{2}$ of $\frac{2}{4}$	$\frac{4}{5} \div 3$	$2\frac{2}{5} \div 6$	$4\frac{4}{7} \div 8$
$\frac{1}{8}$ of $\frac{8}{13}$	$\frac{1}{3}$ of $\frac{4}{5}$	$\frac{7}{8} \div 4$	$3\frac{4}{5} \div 8$	$3\frac{3}{5} \div 11$
$\frac{1}{5}$ of $\frac{5}{12}$	$\frac{1}{4}$ of $\frac{5}{6}$	$1\frac{2}{3} \div 5$	$1\frac{7}{8} \div 10$	$8 \div 14$
$\frac{1}{6}$ of $\frac{6}{17}$	$\frac{1}{5}$ of $\frac{6}{7}$	$1\frac{2}{3} \div 6$	$4\frac{2}{3} \div 12$	$4\frac{5}{6} \div 12$
$\frac{1}{10}$ of $\frac{10}{11}$	$\frac{1}{8}$ of $\frac{7}{8}$	$1\frac{3}{4} \div 3$	$6\frac{5}{9} \div 8$	$9\frac{3}{5} \div 16$

13.	14.	15.	16.	17.
$4 \div \frac{1}{2}$	$8 \div \frac{1}{4}$	$7 \div \frac{3}{5}$	$8 \div 1\frac{3}{5}$	$9 \div 5\frac{7}{8}$
$8 \div \frac{1}{3}$	$8 \div \frac{3}{4}$	$8 \div \frac{6}{11}$	$4 \div 1\frac{1}{3}$	$12 \div 6\frac{2}{3}$
$6 \div \frac{1}{8}$	$6 \div \frac{2}{3}$	$9 \div \frac{5}{8}$	$6 \div 2\frac{1}{3}$	$7 \div 8\frac{3}{5}$
$8 \div \frac{1}{12}$	$9 \div \frac{4}{5}$	$7 \div \frac{7}{10}$	$7 \div 4\frac{1}{5}$	$8 \div 10\frac{4}{7}$
$9 \div \frac{1}{10}$	$12 \div \frac{2}{3}$	$12 \div 1\frac{1}{12}$	$9 \div 6\frac{1}{3}$	$4 \div 3\frac{3}{4}$

18.	19.	20.	21.	22.
$\frac{1}{2} \div \frac{1}{4}$	$\frac{5}{8} \div \frac{3}{5}$	$1\frac{2}{3} \div \frac{4}{5}$	$2\frac{1}{2} \div 3\frac{1}{3}$	$5\frac{1}{4} \div 1\frac{2}{3}$
$\frac{2}{4} \div \frac{2}{3}$	$\frac{6}{7} \div \frac{1}{2}$	$1\frac{7}{8} \div \frac{3}{4}$	$1\frac{1}{4} \div 4\frac{2}{3}$	$2\frac{4}{5} \div 1\frac{3}{7}$
$\frac{3}{8} \div \frac{2}{4}$	$\frac{3}{9} \div \frac{4}{5}$	$3\frac{3}{8} \div \frac{1}{2}$	$1\frac{2}{3} \div 4\frac{1}{5}$	$8\frac{1}{4} \div 6\frac{2}{3}$
$\frac{3}{5} \div \frac{3}{8}$	$\frac{7}{8} \div \frac{3}{9}$	$5\frac{1}{3} \div \frac{3}{4}$	$5\frac{5}{8} \div 6\frac{1}{2}$	$2\frac{4}{8} \div 7\frac{1}{7}$
$\frac{5}{12} \div \frac{3}{4}$	$\frac{3}{8} \div 1\frac{1}{12}$	$1\frac{1}{8} \div 1\frac{1}{3}$	$2\frac{1}{8} \div 6\frac{3}{8}$	$4\frac{1}{6} \div 8\frac{3}{4}$

23.	24.	25.	26.	27.	28.
$1 \div 4$	$2 \div 4$	$5 \div 6$	$4 \div \frac{1}{2}$	$5 \div \frac{1}{8}$	$6 \div \frac{1}{4}$
$7 \div \frac{1}{5}$	$8 \div \frac{1}{3}$	$\frac{3}{4} \div 3$	$\frac{6}{7} \div 2$	$\frac{8}{9} \div 4$	$1\frac{2}{3} \div 6$
$\frac{4}{5} \div 4$	$1\frac{6}{19} \div 8$	$\frac{20}{21} \div 5$	$\frac{25}{27} \div 5$	$\frac{9}{11} \div 3$	$\frac{4}{4}\frac{5}{9} \div 15$
$\frac{2}{3} \div 3$	$\frac{4}{5} \div 6$	$\frac{7}{9} \div 3$	$\frac{8}{15} \div 3$	$\frac{4}{9} \div 5$	$\frac{7}{12} \div 2$
$\frac{1}{8} \div \frac{1}{2}$	$\frac{1}{5} \div \frac{1}{8}$	$\frac{1}{9} \div \frac{1}{4}$	$\frac{2}{5} \div \frac{1}{7}$	$\frac{2}{4} \div \frac{1}{5}$	$\frac{8}{9} \div \frac{1}{2}$
$\frac{3}{4} \div \frac{3}{8}$	$\frac{4}{11} \div \frac{1}{2}$	$\frac{5}{12} \div \frac{3}{4}$	$\frac{3}{8} \div \frac{5}{6}$	$\frac{7}{8} \div \frac{4}{5}$	$\frac{3}{5} \div \frac{1}{9}$

1.	2.	3.	4.	5.
$6\frac{1}{2} \div \frac{1}{2}$	$4\frac{2}{3} \div 7$	$2\frac{1}{8} \div 2$	$1\frac{3}{7} \div 5$	$4\frac{2}{5} \div 11$
$2\frac{1}{8} \div \frac{1}{8}$	$3\frac{1}{8} \div \frac{1}{4}$	$2\frac{5}{8} \div \frac{1}{8}$	$4\frac{1}{8} \div 4$	$4\frac{6}{8} \div 3$
$7 \div 2\frac{1}{3}$	$5 \div 2\frac{1}{2}$	$4 \div 1\frac{1}{3}$	$6 \div 2\frac{1}{4}$	$12 \div 5\frac{1}{2}$
$10 \div \frac{3}{5}$	$20 \div \frac{4}{5}$	$8 \div \frac{3}{7}$	$9 \div \frac{4}{7}$	$12 \div \frac{6}{7}$
$\frac{4}{5} \div \frac{1}{2}$	$\frac{5}{7} \div \frac{1}{8}$	$\frac{4}{5} \div \frac{2}{3}$	$\frac{7}{8} \div \frac{1}{2}$	$\frac{5}{8} \div \frac{1}{10}$

6.	7.	8.	9.	10.
$2\frac{1}{2} \div \frac{1}{8}$	$3\frac{1}{4} \div \frac{1}{2}$	$5\frac{1}{3} \div 2$	$7\frac{1}{2} \div 5$	$8\frac{2}{3} \div \frac{1}{4}$
$9\frac{1}{2} \div \frac{1}{3}$	$7\frac{1}{8} \div \frac{1}{2}$	$4\frac{1}{4} \div 2$	$3\frac{1}{8} \div 10$	$5\frac{1}{4} \div 7$
$8\frac{1}{4} \div 11$	$5\frac{1}{6} \div 2$	$2\frac{1}{3} \div 2$	$3\frac{1}{4} \div 5$	$2\frac{1}{2} \div \frac{3}{4}$
$7\frac{1}{2} \div \frac{1}{4}$	$4\frac{1}{6} \div 9$	$8\frac{1}{3} \div 7$	$2\frac{1}{10} \div 3$	$4\frac{1}{11} \div 9$

11. I paid $\$2\frac{1}{2}$ for 4 yd. cloth. What was the price per yard?

12. 9 lb. of sugar are sold for $62\frac{1}{2}¢$. Cost of 1 lb.?

13. 4 chairs cost $\$9\frac{1}{2}$. What is the cost of 1 chair?

14. 4 yd. of ribbon cost $30\frac{1}{4}¢$. Cost of 1 yard?

15. $\frac{4}{5}$ of a yard of ribbon cost $20\frac{1}{4}¢$. What is the cost of $\frac{1}{5}$?

16. $\frac{3}{4}$ of a house is worth \$1200. What is the value of $\frac{1}{4}$ of the house? of $\frac{4}{4}$ or whole house?

17. $\frac{5}{7}$ of a bushel of corn costs $\$\frac{1}{3}$. What is the cost of $\frac{1}{7}$ of a bushel? of a whole bushel?

18. When $2\frac{1}{3}$ lb. of raisins cost $49¢$, what is the cost of $\frac{1}{3}$ of a pound? Cost of 1 lb.?

19. If a boy earns $\$\frac{3}{4}$ in a day, and saves all his money, how long will it take him to pay for a bicycle costing \$100?

20. How many fruit-jars, each holding $\frac{3}{4}$ of a gallon, can be filled from $9\frac{1}{2}$ gal. of preserves?

21. How many strips of ribbon $1\frac{1}{2}$ yd. in length can be cut from a piece of ribbon containing 10 yd.?

22. How many boxes, each holding $4\frac{1}{2}$ doz. crayons, can be filled from 18 doz. crayons?

23. I have \$20. To how many children can I give $\$\frac{1}{3}$?

24. At $\frac{2}{3}$ of a cent apiece, how many marbles can be bought for $20¢$? for $15¢$?

1. At $\$2\frac{1}{2}$ a ream, what will $\frac{2}{5}$ of a ream of paper cost?

2. Paid $\$\frac{3}{10}$ for $\frac{2}{3}$ of a yard of cloth. What was the price per yard?

3. If a boy earns $\$\frac{1}{3}$ in a day, how long will it take him to earn enough for a bicycle costing $\$100$?

4. $\frac{4}{7}$ of a school are boys; there are 60 girls. How many pupils in all? How many boys?

5. If a furnace consumes $\frac{1}{8}$ of a ton of coal a week, how long will 12 tons last? $5\frac{1}{4}$ tons?

6. At the rate of $1\frac{1}{3}$ miles an hour, how long will a boy be in walking 10 miles?

7. Five boys buy equal shares in a boat costing $\$20\frac{1}{5}$. What should each one pay?

8. The Ruggles Street Quartette received for singing one evening $\$15\frac{1}{4}$. What was each one's share?

9. To how many girls can be given $1\frac{1}{4}$ yd. of ribbon apiece from a piece containing 10 yd.?

10. At $8\frac{1}{3}¢$ a pound, what will 4 lb. of fish cost? $4\frac{1}{2}$ lb.? $5\frac{1}{2}$ lb.?

11. What will $2\frac{2}{3}$ lb. of tea cost at $\$\frac{3}{4}$ a pound?

12. At the rate of 12 lb. for a dollar, what will $\frac{3}{4}$ of a pound of sugar cost? $2\frac{1}{2}$ lb.? $3\frac{3}{4}$ lb.?

13. 3 lb. will cost how many times as much as $1\frac{1}{2}$ lb.? How many times as much as 2 lb.? How many times as much as $\frac{3}{4}$ lb.?

14. $\frac{2}{3}$ of a basket of peaches will cost what part as much as 1 basket? What part as much as 2 baskets? What part as much as $1\frac{1}{3}$ baskets?

15. If I can buy $2\frac{1}{2}$ lb. of sugar for $20¢$, what should I pay for 5 lb.? for $1\frac{1}{4}$ lb.? for $3\frac{3}{4}$ lb.? At the same rate, how much ought I to get for $60¢$? for $70¢$? for $\$1$?

16. I paid $35¢$ for $1\frac{1}{4}$ lb. of steak. What was that a pound? What should I have to pay for $3\frac{3}{4}$ lb. at the same rate?

17. If a man earns $\$1\frac{3}{4}$ a day, how many days will it take him to earn $\$3\frac{1}{2}$? $\$7$? $\$5$?

18. 20 bu. of wheat will cost how many times as much as $2\frac{1}{2}$ bu.? as $4\frac{1}{2}$ bu.? as $3\frac{1}{3}$ bu.?

1. If a barrel of flour lasts a family of 6 persons a month, how much would a family of 3 persons eat in the same time? a family of 9 persons? a family of 7 persons?

2. How many times may $\frac{3}{8}$ of a gallon be drawn from a cask containing 20 gallons?

3. If I can buy $\frac{3}{4}$ of a yard of cloth for \$1, what ought I to pay $1\frac{1}{2}$ yd.? $5\frac{1}{4}$ yd.?

4. If 3 yd. of ribbon cost $\$\frac{3}{8}$, what will $6\frac{3}{8}$ yd. cost?

5. How many pounds of rice at $7\frac{1}{2}¢$ a pound can I buy for \$.90?

6. A box of raisins weighing $12\frac{1}{2}$ lb. was divided equally among 4 persons. At the rate of 12¢ a pound, how much did each person pay for his raisins?

7 If a pound of coffee costs $\$\frac{1}{8}$, how much coffee can be bought for \$1? for $\$\frac{1}{4}$? for $\$6\frac{1}{2}$? for \$12?

8. How much apiece are oranges which sell at the rate of 3 for 5 cents? How much if they sell 3 for 2 cents?

9. What is the cost of $\frac{3}{4}$ of a yard of cloth at $\$1\frac{1}{3}$ a yard?

10. If a man earns $\$1\frac{3}{4}$ a day, how much will he earn in a week? in a month of 26 days?

11. How many days' work can 12 men do in 6 hours, 10 hours being a working day?

12. A and B bought a horse together for \$200, A paying $\frac{1}{8}$ of the cost, and B the remainder. How much did each pay?

13. A man bought some fruit for $\$12\frac{3}{5}$, and was obliged to sell it for $\frac{7}{8}$ of what it cost him. How much did he lose?

14. It will take 1 man a longer or shorter time than 4 men to build a wall? How many times or what part as long? 6 men will take how many times or what part as long as 1 man?

15. If 3 men can do a piece of work in $4\frac{3}{4}$ days, how long will it take 1 man to do it? How long 8 men?

16 At \$38 an acre, what will $2\frac{1}{8}$ acres cost.

17. At the rate of 3 for 5 cents, what will 12 apples cost?

18. I buy $8\frac{1}{8}$ lb. of meat at $12\frac{1}{2}¢$ a pound, and give a two-dollar bill. What change shall I receive?

19. What cost $6\frac{3}{4}$ yd. of cloth at 35¢ a yard?

Written Exercises.

1.	2.	3.	4.
$\frac{1}{15} \times 12$	$4\frac{13}{24} \times 18$	$\frac{13}{20}$ of 18	$\frac{15}{42}$ of 20
$2\frac{7}{8} \times 28$	$6\frac{15}{21} \times 50$	$\frac{8}{8}$ of 54	$\frac{16}{144}$ of 72
$19\frac{2}{3} \times 54$	$4\frac{13}{24} \times 60$	$\frac{11}{12}$ of 78	$\frac{13}{90}$ of 160
$26\frac{1}{5} \times 15$	$15\frac{3}{8} \times 120$	$\frac{5}{9}$ of 180	$\frac{20}{48}$ of 108
$16\frac{5}{12} \times 40$	$125\frac{3}{5} \times 6$	$\frac{18}{40}$ of 27	$\frac{12}{80}$ of 38

5.	6.	7.	8.
$\frac{21}{40}$ of $\frac{6}{15}$	$\frac{51}{180}$ of $\frac{8}{8}$	$3\frac{8}{11} \times 6\frac{2}{3}$	$83\frac{2}{3} \times 2\frac{7}{5}$
$\frac{42}{56}$ of $\frac{31}{120}$	$\frac{27}{84}$ of $\frac{16}{30}$	$8\frac{5}{9} \times 7\frac{13}{15}$	$78\frac{1}{2} \times 3\frac{1}{3}$
$\frac{16}{24}$ of $\frac{74}{190}$	$\frac{35}{100}$ of $\frac{16}{42}$	$9\frac{4}{5} \times 18\frac{6}{21}$	$50\frac{6}{7} \times 5\frac{3}{4}$
$\frac{45}{50}$ of $\frac{13}{27}$	$\frac{17}{24}$ of $\frac{62}{70}$	$7\frac{19}{28} \times 21\frac{3}{19}$	$43\frac{2}{9} \times 9\frac{1}{2}$
$\frac{36}{60}$ of $\frac{13}{25}$	$\frac{25}{42}$ of $\frac{84}{50}$	$14\frac{3}{7} \times 11\frac{6}{14}$	$90\frac{1}{6} \times 1\frac{8}{8}$

9.	10.	11.	12.
$2\frac{1}{4} \times 12\frac{3}{4}$	$59\frac{7}{12} \times 2\frac{1}{4}$	$9\frac{1}{8} \times 16$	$64\frac{2}{3} \times 13\frac{1}{5}$
$27 \times 16\frac{7}{8}$	$104\frac{1}{2} \times 24\frac{1}{3}$	$14\frac{3}{4} \times 27$	$25\frac{1}{8} \times 16\frac{3}{4}$
$40 \times 48\frac{7}{12}$	$216\frac{1}{7} \times 9$	$45\frac{5}{8} \times 9$	$90\frac{3}{8} \times 80\frac{7}{8}$
$16\frac{1}{2} \times 42\frac{3}{4}$	$400\frac{3}{4} \times 6\frac{1}{2}$	$42 \times 2\frac{7}{8}$	$58\frac{5}{8} \times 35\frac{3}{5}$
$25\frac{3}{5} \times 16\frac{3}{8}$	$212\frac{3}{8} \times 16\frac{3}{8}$	$3\frac{3}{10} \times 10\frac{1}{4}$	$29\frac{1}{4} \times 26\frac{3}{7}$

13.	14.	15.	16.	17.
$\frac{7}{8}$ of 214	$\frac{11}{16}$ of 409	$\frac{12}{22}$ of 209	$19 \times 6\frac{3}{4}$	$14\frac{1}{8} \times 9\frac{1}{8}$
$\frac{4}{5}$ of 917	$\frac{8}{21}$ of 718	$\frac{14}{45}$ of 815	$27 \times 89\frac{5}{8}$	$62\frac{5}{7} \times 21\frac{3}{4}$
$\frac{8}{9}$ of 1000	$\frac{12}{42}$ of 5208	$\frac{53}{70}$ of 200	$49 \times 36\frac{4}{17}$	$69\frac{1}{11} \times 6\frac{3}{7}$
$\frac{7}{12}$ of 416	$\frac{28}{37}$ of 40	$\frac{78}{80}$ of 415	$73 \times 18\frac{5}{8}$	$106\frac{4}{15} \times 9\frac{1}{2}$
$\frac{4}{25}$ of 605	$\frac{64}{75}$ of 100	$\frac{73}{150}$ of 942	$41 \times 26\frac{3}{3}$	$200\frac{6}{10} \times 9\frac{3}{4}$

18. Multiply $4\frac{7}{9}$; $7\frac{4}{8}$; $5\frac{3}{7}$; $6\frac{7}{8}$; $16\frac{3}{4}$; $42\frac{1}{8}$; $16\frac{3}{5}$; by $2\frac{11}{4}$.

19. Multiply $64\frac{5}{11}$; $209\frac{4}{17}$; $116\frac{4}{25}$; $246\frac{7}{15}$; $409\frac{5}{13}$; $42\frac{7}{20}$ by $2\frac{1}{8}$.

20. What is $\frac{5}{8}$ of $4\frac{7}{12}$? of $16\frac{4}{11}$? of $21\frac{8}{8}$? of $64\frac{1}{2}$? of $46\frac{3}{7}$?

21. What is $\frac{3}{4}$ of 120? of $140\frac{6}{19}$? of $420\frac{5}{8}$? of $916\frac{4}{21}$? of $109\frac{3}{4}$?

22.	23.	24.	25.
$8\frac{3}{4} \times 2\frac{7}{8} \times 3\frac{1}{2}$	$2\frac{3}{8} \times 4\frac{1}{2} \times 6\frac{7}{12}$	$2\frac{2}{3} \times 30\frac{4}{5}$	$4\frac{18}{15} \times 7\frac{3}{29}$
$4\frac{5}{6} \times 6\frac{4}{5} \times 5\frac{3}{4}$	$16\frac{1}{2} \times 4\frac{1}{9} \times 12$	$1\frac{1}{2} \times 60\frac{3}{7}$	$9\frac{19}{13} \times 6\frac{17}{25}$
$\frac{3}{8} \times 2\frac{1}{7} \times 16$	$21\frac{3}{4} \times 16\frac{1}{2} \times 8$	$2\frac{3}{4} \times 9\frac{3}{11}$	$27\frac{4}{5} \times 3\frac{3}{8}$
$\frac{4}{5} \times 16\frac{1}{8} \times 200$	$51\frac{3}{7} \times 14\frac{1}{2} \times 11$	$6\frac{1}{4} \times 25\frac{1}{8}$	$19\frac{1}{11} \times 6\frac{3}{17}$

1 What must be paid for 650 tons of coal at $\$6\frac{7}{8}$ a ton?

2 A boy picks $12\frac{7}{8}$ qt. of berries in a day. How many quarts can he pick in 27 days at the same rate?

3 How many feet around a field that is $42\frac{1}{8}$ rd. long and $36\frac{3}{4}$ rd. wide? How many yards?

4 What will it cost to enclose the above field with a barbed wire fence of three wires, the wire costing $1\frac{1}{2}¢$ a foot?

5 What will a mile of street railway cost if a foot costs $\$96\frac{4}{11}$?

6. A man left a fortune of $96,421. The wife received $\frac{2}{3}$, the son $\frac{1}{4}$, and the remainder he gave to a hospital. What was the share of each?

Find the cost of:

7. 46 lb. of butter @ $39\frac{3}{4}¢$.
8. $17\frac{3}{5}$ lb. of coffee @ $46\frac{3}{8}¢$.
9. 296 yd. of silk @ $\$3\frac{4}{7}$.
10. 425 bbl. of apples @ $\$2\frac{9}{11}$.
11. 64 bbl. of flour @ $\$9\frac{4}{5}$.
12. $24\frac{1}{2}$ gal. of oil @ $12\frac{1}{2}¢$.
13. $45\frac{5}{8}$ tons of coal @ $\$6\frac{7}{8}$.
14. $29\frac{3}{4}$ bu. of charcoal @ $50¢$.
15. 215 qt. of berries @ $13\frac{3}{4}¢$.
16. $96\frac{5}{8}$ lb. of tea @ $59\frac{1}{2}¢$.
17. 324 lb. of beef @ $25\frac{3}{4}¢$.
18. 926 acres of land @ $\$59\frac{3}{11}$.
19. $16\frac{3}{4}$ yd. of lace @ $\$1\frac{8}{9}$.
20. 97 yd. of carpet @ $\$4\frac{3}{5}$.
21. 45 desks @ $\$19\frac{4}{15}$.
22. $426\frac{1}{3}$ lb. of starch @ $17\frac{3}{4}¢$.
23. $87\frac{3}{4}$ bu. of wheat @ $89\frac{5}{7}¢$.
24. 1246 bbl. of sugar @ $\$12\frac{5}{16}$.

25.	26.	27.	28.
$1\frac{3}{2} \div 117$	$27\frac{3}{8} \div 342$	$382\frac{1}{9} \div 26$	$\frac{83}{200} \div 125$
$6\frac{3}{8} \div 400$	$65\frac{3}{8} \div 1000$	$84\frac{3}{8} \div 1728$	$63\frac{5}{4} \div 38$
$108\frac{1}{2} \div 28$	$\frac{37}{85} \div 45$	$654\frac{1}{2} \div 540$	$\frac{45}{1080} \div 80$
$72\frac{3}{4} \div 20$	$66\frac{3}{3} \div 450$	$3\frac{1}{8} \div 1840$	$6\frac{605}{10000} \div 37$
$\frac{1}{450} \div 18$	$87\frac{1}{2} \div 700$	$12\frac{1}{2} \div 1600$	$404\frac{8}{90} \div 150$

29.	30.	31.	32.
$20 \div \frac{3}{2}$	$12\frac{3}{8} \div \frac{3}{4}$	$15\frac{1}{4} \div \frac{8}{8}$	$6\frac{1}{13} \div 2\frac{1}{2}$
$64 \div \frac{8}{5}$	$16\frac{3}{3} \div \frac{5}{6}$	$16\frac{3}{4} \div \frac{3}{7}$	$5\frac{3}{19} \div 3\frac{1}{4}$
$3\frac{1}{2} \div \frac{6}{15}$	$18\frac{5}{18} \div 1\frac{1}{10}$	$29\frac{5}{7} \div \frac{3}{16}$	$6\frac{7}{25} \div 19$
$7\frac{2}{15} \div \frac{3}{20}$	$72\frac{3}{25} \div 1\frac{4}{5}$	$46 \div 4\frac{3}{11}$	$4\frac{8}{8} \div 15\frac{1}{4}$
$8\frac{3}{26} \div 90$	$80\frac{2}{8} \div \frac{12}{130}$	$200 \div 8\frac{3}{15}$	$9\frac{5}{14} \div 6\frac{7}{7}$

1.	2.	3.	4.
$26\frac{1}{2} \div 3$	$142\frac{3}{4} \div 17$	$16\frac{3}{4} \div 49\frac{1}{2}$	$208\frac{1}{2} \div 9$
$79\frac{1}{12} \div 5$	$208\frac{5}{8} \div 30$	$27\frac{3}{8} \div \frac{5}{27}$	$\$4.21\frac{3}{4} \div 26$
$46\frac{9}{28} \div 8$	$423\frac{6}{7} \div 90$	$62\frac{9}{13} \div 14\frac{3}{5}$	$\$7.90\frac{5}{8} \div 42$
$54\frac{8}{13} \div 6$	$291\frac{3}{11} \div 42$	$71\frac{8}{9} \div 10\frac{1}{4}$	$\$2.09\frac{3}{11} \div 56$
$90\frac{4}{9} \div 12$	$62\frac{8}{15} \div 36$	$40\frac{2}{21} \div 2\frac{3}{7}$	$\$6.12\frac{5}{42} \div 20$

5.	6.	7.	8.
$\frac{18}{42} \div 9$	$100 \div 6\frac{4}{5}$	$\frac{28}{80} \div 8$	$4\frac{1}{2} \div 2\frac{1}{3}$
$3\frac{4}{7} \div 5$	$110 \div 16\frac{2}{3}$	$42\frac{1}{8} \div 6$	$9\frac{3}{4} \div 7\frac{1}{8}$
$6\frac{4}{8} \div 3$	$\$205 \div 19$	$27\frac{1}{8} \div 14$	$4\frac{3}{11} \div 6\frac{1}{15}$

9.	10.	11.
$250 \div \frac{21}{50}$	$17\frac{3}{5} \div 100$	$212\frac{5}{6} \div 21\frac{1}{2}$
$360 \div 3\frac{1}{3}$	$42\frac{8}{15} \div 4\frac{1}{2}$	$2012 \div 14\frac{1}{2}$
$416 \div 5\frac{1}{2}$	$109\frac{3}{4} \div 33$	$42\frac{5}{11} \div 12\frac{3}{4}$
$13\frac{1}{4} \div \frac{1}{4}$	$215\frac{3}{7} \div 21$	$71\frac{8}{8} \div \frac{8}{4}$
$100\frac{1}{3} \div 90$	$62\frac{5}{8} \div 4\frac{1}{8}$	$150 \div 40\frac{1}{4}$

12.	13.	14.
$\frac{9}{23} \div \frac{6}{12}$	$\frac{900}{107} \div \frac{4}{9}$	$\frac{84}{109} \div 4\frac{3}{7}$
$\frac{18}{20} \div \frac{4}{5}$	$\frac{42}{88} \div \frac{6}{7}$	$\frac{212}{340} \div 6\frac{2}{4}$
$\frac{68}{72} \div \frac{8}{9}$	$\frac{18}{216} \div 1\frac{4}{6}$	$\frac{221}{300} \div \frac{1}{40}$
$\frac{59}{100} \div \frac{7}{10}$	$\frac{47}{150} \div \frac{9}{10}$	$\frac{215}{429} \div \frac{5}{9}$

15.	16.	17.
$21\frac{3}{4} \div 9\frac{1}{2}$	$400\frac{4}{7} \div 25\frac{1}{4}$	$519\frac{7}{12} \div \frac{5}{6}$
$436\frac{1}{4} \div 7\frac{3}{4}$	$1000\frac{1}{18} \div 62\frac{1}{9}$	$429\frac{3}{25} \div 1\frac{5}{16}$
$721\frac{5}{11} \div 4\frac{2}{3}$	$2015\frac{1}{8} \div \frac{3}{4}$	$263\frac{1}{2} \div 106\frac{3}{4}$

18. $\dfrac{4500 \times 10}{100} = ?$

19. $\dfrac{78 \times 500}{80 \times 5} = ?$

20. $\dfrac{860 \times 50 \times 3}{18 \times 25 \times 2} = ?$

21. $\dfrac{8694 \times 200 \times 104}{99 \times 65 \times 16} = ?$

22. $\dfrac{48 \times 105 \times 600}{850 \times 735} = ?$

23. $\dfrac{1728 \times 660 \times 75}{144 \times 72 \times 30} = ?$

1. $\frac{\$40 \times 60 \times 25}{80 \times 6} = ?$

2. $\frac{\$8 \times 34 \times 15}{85 \times 105} = ?$

3. $\frac{\$1.20 \times 30 \times 45}{75 \times 9} = ?$

4. $\frac{27 \text{ bu.} \times 150 \times 25}{100 \times 45} = ?$

5. $\frac{\$1.28 \times 8 \times 31\frac{1}{2}}{10\frac{1}{2} \times 40} = ?$

6. $\frac{18 \text{ T.} \times 24 \times 36}{72 \times 8} = ?$

7. If $10\frac{1}{2}$ lb. of sugar cost $50¢$, what will 30 lb. cost? How many pounds can I buy for $75¢$?

8. If 8 bu. of potatoes cost $5, how many bushels can be bought for $12.50? What will $20\frac{1}{2}$ bu. cost?

9. If $2\frac{1}{2}$ bu. of apples will buy 3 bu. of potatoes, how many bushels of apples will buy $30\frac{1}{2}$ bu. of potatoes? How many bushels of potatoes will be given in exchange for 50 bu. of apples?

10. If it takes 100 yd. of cloth to make 18 suits of clothes, how many yards will it take to make 40 suits? How many suits can be made from $60\frac{1}{2}$ yd., and how many yards left over?

11. How many tons of coal can be bought for $70, at the rate of $\$6\frac{3}{4}$ a ton? At the same rate, what will $4\frac{1}{2}$ tons cost?

12. If a franc is worth $18\frac{3}{4}¢$, how much of our money could I get for 30 francs? How many francs could I get for $\$37\frac{1}{2}$?

13. How many breadths of carpet $\frac{5}{6}$ of a yard wide will be necessary for a floor 15 ft. wide? 20 ft. wide?

14. How many bushels of corn at $1 a bushel can I buy for $18\frac{3}{5}$ doz. eggs at $\$\frac{3}{5}$ a dozen? How many bushels at $\$\frac{7}{8}$ a bushel? How many at $\$1\frac{1}{4}$ a bushel?

15. I bought 16 yd. of cloth at $\$\frac{3}{4}$ a yard, and sold it at $\$\frac{7}{8}$ a yard. What was the profit?

16. I sold 50 bu. of wheat for $45. It cost me $\frac{7}{8}$ as much as I sold it for. What was the gain on 1 bushel? At the same rate, what would be the gain on 1000 bushels?

17. There are 42 gal. of kerosene oil in a barrel. How many gallons in $6\frac{3}{4}$ bbl.? What would $18\frac{1}{2}$ bbl. cost at $8\frac{1}{2}¢$ a gallon?

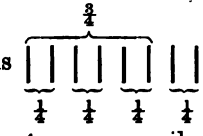
18. How much will be received for $36\frac{3}{4}$ days' work at $\$1\frac{1}{8}$ a day? How long will it take to earn $\$42\frac{1}{2}$ at the same wages?

Oral and Written Exercises.

1. $\frac{2}{3}$ of my apples are 2. How many apples have I?

$\frac{2}{3} = \left\{\begin{array}{l} \circ\ \frac{1}{3} \\ \circ\ \frac{1}{3} \\ \circ\ \frac{1}{3} \end{array}\right\} \frac{3}{3} = $ — apples.

2. $\frac{3}{4}$ of my pencils are 6. How many pencils have I?



$\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

$\frac{4}{4} =$ — pencils.

3. 8 cents is $\frac{1}{3}$ of all the money I have. How many cents have I?

4. If 8 cents is $\frac{2}{3}$ of my money, how many cents is $\frac{1}{3}$? How many cents is $\frac{3}{3}$?

$8¢ = \frac{2}{3}$ of money.
$? = \frac{1}{3}$ "
$? = \frac{3}{3}$ "

5. 9 eggs are $\frac{3}{4}$ of all the eggs I sold. How many eggs did I sell?

6. I gave Mary 12 cents, which was $\frac{3}{4}$ of what I gave Florence. How much did I give Florence?

7. Make up problems from the following:

$15 = \frac{3}{5}$	$20 = \frac{5}{8}$	$21 = \frac{7}{12}$	$20 = \frac{3}{7}$
$? = \frac{1}{5}$	$? = \frac{1}{8}$	$? = \frac{1}{12}$	$? = \frac{1}{7}$
$? = \frac{5}{5}$	$? = \frac{8}{8}$	$? = \frac{12}{12}$	$? = \frac{7}{7}$

8. How many times is $\frac{3}{4}$ contained in 4? in $8\frac{1}{2}$? in $\frac{3}{4}$ of 6? in $\frac{3}{8}$ of 12? in $\frac{5}{6}$ of 24? in $\frac{1}{5}$ of 2?

9. If a cup holds $\frac{1}{3}$ of a pint, how many cupfuls in 1 pt.? in 1 qt? in 1 gal.? in $2\frac{1}{2}$ qt.? in 1 gal. and 1 pt.?

10. How many tons of coal at $\$6\frac{2}{3}$ a ton can be bought for \$20?

11. If an acre of land is worth \$40, what part of an acre will \$24 buy?

12. If apples cost $42¢$ a bushel, and sell for $60¢$, what part of the cost is the gain?

13. A and B mowed a field, A working 2 days, B 3 days. What part of the whole sum received should each one be paid?

14. A man divided $\frac{3}{4}$ of an acre into 4 house-lots. What part of an acre in each house-lot?

1. If 8 lb. of butter costs $3\frac{1}{5}$, what is the price of 1 lb.?

2. If a person walks a mile in $\frac{2}{3}$ of an hour, how many miles can he walk in 12 hours?

3. If a man can do $\frac{3}{4}$ of a piece of work in 4 days, how much of it can he do in 1 day?

4. How many yards are there in 50 feet?

5. If $\frac{1}{4}$ of a bushel of potatoes costs 16¢, what will 1 bushel cost?

6. John is 4 years old, which is $\frac{1}{8}$ as old as his father. How old is his father?

7. William has 8 cents, which is $\frac{2}{3}$ as much as James has. How much has James?

8. If $\frac{2}{3}$ of a certain number is 18, what is the entire number?

9. A grocer sold $\frac{3}{8}$ of a barrel of oil, and has 20 gal. left. How many gallons were there in the entire barrel?

10. Henry, Robert, and Ernest buy a bicycle together. Henry pays $10, which is $\frac{2}{5}$ as much as Robert pays; and Robert pays $\frac{5}{8}$ as much as Ernest pays. What is the cost of the bicycle?

11. A farmer sold $\frac{2}{3}$ of his farm for $1200. At the same rate, what would he sell $\frac{1}{2}$ of the remainder for?

12. A man paid $75 for a watch, and $\frac{3}{5}$ as much for a chain. How much did both watch and chain cost?

13. Bought $2\frac{2}{3}$ bushels of grain for $1.60. What will $1\frac{1}{2}$ bushels cost at the same rate?

14. A man had $2.25, which he exchanged for francs at $18\frac{3}{4}$ cents each. How many francs did he receive?

15. A man hoed a piece of corn in $8\frac{2}{3}$ days, hoeing $\frac{3}{4}$ of an acre each day. How many acres were in the piece?

16. How many dozen eggs at $\frac{3}{10}$ of a dollar a dozen will pay for $3\frac{1}{2}$ yards of cloth at $1\frac{1}{4}$ a yard?

17. What is the number to which, if $\frac{3}{5}$ of itself be added, the sum will equal 20?

18. John's age is $12\frac{1}{2}$ years, and Thomas's age is $\frac{2}{3}$ of John's. How old is Thomas?

19. A lady paid $20 for a dress, which was $\frac{2}{5}$ more than she paid for a bonnet. What was the cost of the bonnet?

1. At the rate of $16\frac{2}{3}$ lb. for \$1, what will $8\frac{1}{2}$ lb. of sugar cost?

2. If a barrel of flour will supply 8 persons $7\frac{2}{3}$ week, how long will it supply 3 persons?

3. A has 3 times as much money as B. Both together have \$60. What has each?

4. If $\frac{3}{4}$ of A's money equal $\frac{1}{8}$ of B's, and both together have \$140, how much has each?

5. When coal is $\$6\frac{1}{4}$ a ton, what part of a ton can be bought for $\$2\frac{1}{2}$? for 60¢?

6. When potatoes are worth $\$2\frac{1}{8}$ a barrel, what quantity can be bought for \$7?

7. If a peach is worth $\frac{2}{3}$ of an orange, how many peaches are worth as much as 20 oranges?

8. At $\$\frac{7}{8}$ a yard, how much lace can be bought for \$21?

9. If $\frac{3}{4}$ yd. of silk costs $\$2\frac{1}{8}$, what will 6 yards cost?

10. When $2\frac{1}{4}$ yd. of velvet are worth \$12, what will 4 yd. cost?

11. I paid 64¢ for $2\frac{3}{8}$ lb. of beef. At this rate, what will $\frac{1}{4}$ lb. cost? $18\frac{4}{8}$ lb.?

12. If $\$\frac{7}{8}$ will buy 20 oranges, what is the value of a dozen?

13. $\$\frac{2}{3}$ will buy a dozen eggs. What are 7 eggs worth at this rate?

14. If $\frac{1}{4}$ of a man's property is in a house worth \$2000, what is the value of his whole property?

15. I bought a horse, and paid down $\frac{1}{4}$ of the price. Three months later I paid $\frac{1}{2}$ of the price. If I still owe \$50 for the horse, what was the price to be paid?

16. A man bought a farm with the understanding that he must pay $\frac{1}{8}$ of the price in 3 months, $\frac{1}{4}$ in 6 months, and the balance at the end of the year. The first two payments amounted to \$1400. How much must he pay at the end of the year?

17. I bought a house and 3 acres of land for \$3000. If the house is worth \$2000, what is the land worth an acre?

18. A house and farm containing $38\frac{2}{3}$ acres were sold for \$3840. Allowing the house to be worth \$2000, what was the worth of the land an acre?

1. John can saw a cord of wood in 3 days; his brother Frank can saw it in 2 days. What part of the cord could both together saw in one day? How many days would it take them both to saw it?

2. A can do a certain piece of work in 6 days, B can do it in 4 days, and C can do it in 3 days. How long will it take A and B to do it? How long A and C? How long B and C? How long all together?

3. On Monday a boy has 24 cents, which is $\frac{4}{5}$ as much as he has on Tuesday; and on Tuesday he has $\frac{8}{9}$ as much as he has on Wednesday. How much has he on Wednesday?

4. A merchant's profits were $\frac{1}{4}$ more in February than they were in January. In February his profits were \$120. What were his profits in January?

5. If I spend $\frac{1}{6}$ of all the money I have, and still have \$3.50, how much money had I before I spent any?

6. I bought $\frac{3}{8}$ of a ship for \$16,500. What is the entire ship worth at that rate? What should be paid for $\frac{5}{16}$ of it?

7. In a certain school $\frac{3}{5}$ of the pupils are girls. If there are in the school 8 more girls than boys, how many pupils in the school?

8. A man left by will $\frac{3}{4}$ of his estate to his wife, and the rest to be equally divided among 3 children. If each child has \$4000, what was the value of the estate? What did the widow receive?

9. If 6 lb. of coffee worth $\$\frac{3}{10}$ a pound be mixed with 8 lb. worth $\$\frac{5}{8}$, what is the worth of 1 lb. of the mixture?

10. If $18\frac{2}{3}$ lb. of tea worth $\$\frac{5}{8}$ a pound is mixed with $24\frac{1}{4}$ lb. worth $\$\frac{3}{4}$ a pound, what is a pound of the mixture worth?

11. A travelling salesman started on Monday morning with \$100 to pay his expenses. When he returned Saturday night he had \$49.60. What was the average expense a day?

12. A man bought $\$88\frac{1}{2}$ worth of furniture, to be paid in weekly installments of $\$14\frac{7}{10}$ each. How many weeks did it take him to pay the debt?

13. At $\$12\frac{2}{3}$ a ton, how many tons of hay can be bought for \$2000?

1. A and B are 40 miles apart. They start towards each other, A at the rate of $2\frac{1}{2}$ miles an hour, and B at the rate of 3 miles an hour. In how many hours will they meet?

2. A farm is divided into four fields, containing respectively $28\frac{3}{4}$ A., $46\frac{7}{12}$ A., $37\frac{1}{8}$ A., $78\frac{8}{15}$ A. How many acres in the farm?

3. James has 48 cents, which is 2 times as much as William has, and William has 3 times as much as Thomas. How much have they all together?

4. A man bequeathed to his son \$8400, which was $1\frac{2}{3}$ times as much as he gave to his daughter. His wife's portion was $3\frac{1}{2}$ times as much as his son and daughter's. What sum did he bequeath to all?

5. A bought $\frac{3}{4}$ of a factory for \$12,640. He sold $\frac{2}{3}$ of his share to B, and $\frac{1}{8}$ of it to C. What part of the factory did A then own? What is the whole factory worth? What is B's share worth?

6. From a barrel of pork weighing 200 lb. there were sold at one time 27 lb. 5 oz., and at another time $18\frac{3}{8}$ lb. How many pounds remained, and what was it worth at $12\frac{1}{2}$¢ a pound?

7. If a man walks $8\frac{3}{4}$ miles in $1\frac{3}{4}$ hours, how far at the same rate will he walk in $3\frac{1}{2}$ days, walking $6\frac{1}{2}$ hours a day?

8. If 3 men mow $\frac{1}{4}$ of a field in a day, how many days will it take them to finish it?

9. If 4 men mow $\frac{1}{8}$ of a field in a day, how many days will it take them to finish it?

10. If A can mow an acre in $\frac{3}{4}$ of a day, and B can mow an acre in $\frac{5}{6}$ of a day, how long will it take them both to mow an acre? How long will it take them to mow 20 acres?

11. A man pays $\frac{1}{3}$ of his salary for board, $\frac{1}{5}$ for books, $\frac{1}{6}$ for other expenses, and then has left \$225. How much is his salary?

12. Mr. Eddy spends $\frac{2}{5}$ of his salary for board, $\frac{1}{2}$ of the remainder for clothing, $\frac{1}{3}$ of the remainder for other expenses, and has \$500 left. What is his salary?

13. Bought stock at $\$99\frac{1}{4}$ a share, and sold it at $\$102\frac{1}{8}$. Find gain on 49 shares.

14. How many shares of stock at $\$98\frac{1}{2}$ each can be bought for \$7500?

1. Find the cost of 16 rolls of carpet at $98\frac{3}{8}¢$ a yard, each roll containing $47\frac{3}{4}$ yards.

2. If $\frac{4}{5}$ of a yard of cloth costs $\$2\frac{7}{8}$, what will $9\frac{3}{4}$ yards cost?

3. A farmer sold $6\frac{4}{7}$ bbl. of apples at the rate of $2\frac{1}{2}$ bbl. for $\$6\frac{3}{5}$. How much did he receive?

4. A merchant sold 49 yd. of cloth at the rate of $2\frac{1}{12}$ yd. for $\$4\frac{5}{7}$. How much received?

5. A coal-dealer bought 1246 tons of coal at $4\frac{7}{8}$ a ton, and sold it for $\$6\frac{1}{7}$. What was his gain?

6. What is the value of a farm if $\frac{5}{16}$ of it is worth $\$2040\frac{1}{8}$?

7. A man owning $\frac{9}{11}$ of a factory sold half of his share for $1026. At this rate, what was the value of the entire factory?

8. If $\frac{4}{5}$ of an acre of land will pay for 140 bu. of wheat at $49\frac{1}{2}¢$ a bushel, what is 1 acre worth?

9. Mr. Hardy's house and land are worth $11,294. The land cost $\frac{3}{5}$ as much as the house. Find the value of each.

10. If $\frac{5}{9}$ of a ton of hay is worth $\$12\frac{1}{2}$, how many tons can be bought for $150?

11. How many suits requiring $6\frac{1}{4}$ yd. of cloth each can be cut from $100\frac{1}{8}$ yd.?

12. A man invested $\frac{4}{15}$ of his money in real estate, put $\frac{3}{8}$ in the bank, and then had $8600. How much had he at first?

13. A real estate agent exchanged a city lot containing 4264 ft., worth $27\frac{3}{4}¢$ a foot, for a farm of $78\frac{1}{2}$ acres. What was the value of 1 acre?

14. If 2 lb. of candy cost $40¢$, what part of a pound can be bought for $15¢$?

15. If 17 lb. of beef cost $\$4.50\frac{1}{2}$, what part of a pound can be bought for $20¢$?

16. A milkman sold 976 qt. of milk at $6\frac{1}{2}¢$ a quart, and bought $27\frac{3}{4}$ bu. of oats at $65\frac{1}{2}¢$ a bushel. How much money did he have left?

17. How many jars holding $1\frac{7}{8}$ qt. can be filled from $49\frac{3}{8}$ qt.?

18. If a boy can do a piece of work in 7 days, what part of it can he do in 3 days? in $4\frac{1}{2}$ days?

1. If a boy can do a piece of work in $19\frac{1}{2}$ days, what part of it can he do in $10\frac{1}{3}$ days?

2. What will $29\frac{3}{7}$ yd. of lace cost at $\$1.15\frac{1}{4}$ for $\frac{1}{8}$ of a yard?

3. A farm consists of 4 fields. The first field contains $27\frac{3}{4}$ acres; the second contains $2\frac{1}{2}$ times as much as the first; the third contains a quantity equal to the difference between the first and second; and the fourth contains as much as the second and third. How many acres in the farm?

4. A boy loses \$19, which is $\frac{7}{11}$ of what he has left. How much had he at first?

5. If $\frac{8}{9}$ of a house is valued at \$1946, what is the value of $\frac{3}{8}$ of it?

6. A merchant bought two pieces of cloth, one containing $46\frac{1}{2}$ yd., the other $63\frac{7}{8}$ yd. He sold $12\frac{1}{8}$ yd., $9\frac{3}{4}$ yd., $17\frac{1}{3}$ yd., and $4\frac{5}{12}$ yd. How many yards remained?

7. $\frac{5}{6}$ of $42\frac{3}{5}$ gallons of oil was sold at $12\frac{1}{2}$¢ a gallon. How much received?

8. A vessel sails $123\frac{3}{4}$ miles in $9\frac{1}{3}$ hours. How long will it take her to go 500 miles?

9. Bought $60\frac{5}{6}$ dozen blank-books for \$30. What do I gain by selling them at 5¢ apiece?

10. A lady bought $14\frac{1}{2}$ yd. of cloth @ $\$1\frac{3}{4}$ a yard; paid $\frac{1}{4}$ as much for trimmings, and $\$12\frac{3}{8}$ for the making. After paying the bill, how much money had she left from \$50?

11. If a man can walk $8\frac{5}{8}$ miles in $2\frac{1}{4}$ hours, how long will it take him to walk $162\frac{5}{16}$ miles?

12. I bought a quantity of corn for $\$50\frac{2}{3}$, and selling it for $\frac{3}{5}$ of its cost, I lost $10\frac{1}{2}$¢ on a bushel. How many bushels did I buy?

13. A clerk earns \$65 a month, and spends $\$49\frac{3}{5}$ a month. How much does he save in $2\frac{1}{2}$ years?

14. If I save $\$21\frac{1}{3}$ a month, how long will it take me to save \$1000? $\$600\frac{1}{4}$?

15. $14\frac{1}{7}$ tons of hay were bought for $\$305\frac{1}{4}$. At this rate, how many tons can be bought for \$900?

16. A man works 5 days at the rate of $\$9\frac{3}{4}$ a week. How much does he earn?

1. A man paid \$7007 for $\frac{7}{8}$ of a farm containing 416 acres. He sold $\frac{3}{5}$ of what he bought at \$20$\frac{1}{3}$ an acre, and the rest at \$19$\frac{7}{8}$ an acre. What was his gain?

2. What is gained by selling $\frac{5}{7}$ of a factory for \$6240, if $\frac{7}{8}$ of it is worth \$8022?

3. Find the entire cost of 29$\frac{1}{2}$ bu. of wheat at 50$\frac{1}{3}$¢ a bushel, 19$\frac{1}{4}$ bu. of corn at 42$\frac{1}{4}$¢ a bushel, and 120 bu. of rye at 49$\frac{3}{5}$¢ a bushel.

4. The Potomac River is $\frac{5}{9}$ as long as the Kansas, which is $\frac{9}{10}$ as long as the Yellowstone, which is $\frac{5}{6}$ as long as the Red, which is $\frac{3}{5}$ as long as the Arkansas, which is $\frac{10}{11}$ as long as the St. Lawrence, which is $\frac{2}{3}$ as long as the Nile, which is $\frac{1}{1}\frac{1}{2}$ as long as the Amazon, which is $\frac{9}{10}$ as long as the Mississippi. Reckoning the Mississippi as 4000 miles long, how long is each of the other rivers?

5. How many pounds of water in a barrel of apples which weighs 200 lb., if $\frac{2}{3}\frac{3}{3}$ of the apples consists of water? How many pounds of water in a bushel of wheat (60 lb.), if $\frac{7}{5}\frac{7}{0}$ of the wheat consists of water?

6. The natural life of the dog is said to be 1$\frac{1}{3}$ times as long as that of the cat. If the natural life of the cat is 15 years, what is the natural life of the dog?

7. If the shadow of a church spire is 60 feet long at a time when the shadow of a post is $\frac{3}{5}$ as long as the post is high, how high is the spire?

8. Water expands $\frac{1}{2}\frac{1}{4}$ of its volume when heated from the freezing point to the boiling point. A barrel of water (31 gal.) will measure how much at the boiling point? If a cubic foot of water weighs 62$\frac{1}{2}$ lb. at the freezing point, what will a cubic foot weigh at its boiling point?

9. The distance from New York to Philadelphia is 90 miles, which is $\frac{1}{2}$ of the distance to Saratoga, which is $\frac{1}{2}$ of the distance to Richmond, which is $\frac{3}{4}$ of the distance to Bangor, which is $\frac{2}{3}$ of the distance to Ann Arbor, which is $\frac{4}{5}$ of the distance to Louisville, which is $\frac{3}{8}$ of the distance to Jackson, which is $\frac{5}{6}$ of the distance to Salt Lake City, which is $\frac{4}{5}$ of the distance to San Francisco. How far from New York to each of the places named?

SECTION IV.

DECIMAL FRACTIONS, COMPLETED.

Oral and Written Exercises.

1. Copy and read: .7; .18; .169; .07; .70; .017; .208; .009; 1.09; 6.004; 80.070.

2. Write decimally: $\frac{8}{10}$; $\frac{64}{100}$; $\frac{846}{1000}$; $\frac{7}{100}$; $\frac{7}{1000}$; $\frac{70}{100}$; $\frac{70}{1000}$; $\frac{83}{1000}$; $\frac{104}{1000}$; $\frac{100}{10}$.

3. How many tenths, hundredths, and thousandths in each of the following decimals? .648; .309; .008; .700; .830.

4. Express decimally: $\frac{8}{100}$; $\frac{604}{1000}$; $\frac{8}{1000}$; $\frac{488}{100}$; $\frac{1}{10}$ of 1; $\frac{1}{10}$ of .1; $\frac{1}{10}$ of .01.

5. How many hundredths in a unit? How many thousandths? How many ten-thousandths?

6. In the number 666.666, show the relative value of each digit with reference to others: *e.g.*, 6 thousand is ten times the value of 6 hundred; 6 hundred is $\frac{1}{10}$ of 6 thousand, etc.

7. Copy and read: .44; .444; .4444; .0004; .0044; .0404; .4004. Each 4 here given expresses what value?

8. Express in form of a common fraction each of the following decimals: .06; .007; .0008; .0078; .708; .9008; .8097; .0609; 1.0007; 40.0008.

9. Write decimally: $\frac{3}{4}$; $\frac{3}{40}$; $.1\frac{1}{10}$; $.1\frac{12}{100}$; $.1\frac{1}{100}$; $.01\frac{1}{2}$; $.001\frac{1}{2}$; $.001\frac{1}{10}$; $.01\frac{1}{4}$; $.04\frac{3}{4}$.

10. Write: Eight hundred four thousandths; nine hundred seventeen ten-thousandths; nine hundred and seventeen ten-thousandths; eight thousand seven ten-thousandths; seven hundred eighteen and six thousand four hundred four ten-thousandths; seventy ten-thousandths; six thousand four ten-thousandths; seven thousand ten-thousandths; ninety thousand and seven hundred six thousandths; eight thousand sixty ten-thousandths.

1. Read the numerators and denominators in each of the following fractions: $\frac{87}{1000}$; .009; .709; .0809; .0006; .7603; .0809; .7008; .1010; .7038.

2. How many ten-thousandths in 4? in 6? in .1? in .01? in .001? in .013? in .106? in .070? in 1.01? in .700?

3. Write decimally $\frac{1}{10}$ of .0001, or 1 hundred-thousandth.

4. Copy and read: .0006; .00006; .00666; .00606; .06006.

5. Read the tenths, hundredths, thousandths, ten-thousandths, hundred-thousandths, millionths, ten-millionths, hundred-millionths, and billionths in the following decimal: .546819273.

6. Copy and read: .07603; .009704; .04070; .000436; .080083; .0008006; .030080389.

7. Write: Four hundred seven ten-thousandths; eight thousand four hundred-thousandths; nine millionths; seven hundred and seven hundred-thousandths; four hundred fifty ten-millionths; nine thousand and fifty millionths; ten thousand sixty and eight thousand forty-five hundred-thousandths.

8. How many thousandths in 2.? in .2? in .04? in 2.04?

9. How many millionths in .01? in .10? in .004? in .0408? in .00146?

10. How many tenths in 6? in .60? in 800 thousandths?

11. Write as decimals of a dollar and add: 6¢; 80¢; 8 mills; 60 mills; .5 of a mill.

12. Reduce to lowest terms in form of decimals: $\frac{800}{1000}$; .700; .0640; .00400.

13. Express decimally in simplest forms: 860 tenths; 794 hundredths; 8460 thousandths; 9600 tenths; 4500 hundred-thousandths; 70,000 millionths; 940 ten-thousandths; 6000 hundredths.

14. Write and add: 7 hundredths; 85 thousandths; 6 and 9 tenths; 34 thousandths; 148 ten-thousandths.

15. Write and add: Eighty-five thousandths; eighty and seventeen hundredths; four hundred seventy-five ten-thousandths.

16. Write and add: Eight hundred thirty-nine ten-thousandths; seventy-six millionths; five hundred twenty-eight thousandths; seventy-three and four hundred fifty ten-thousandths.

1. Write and add: Seven thousand and seven thousandths; five hundred six and twelve hundredths; seventy and seven millionths; seven hundred forty hundred-thousandths; nine hundred fifty-seven hundred-millionths; one hundred seventeen hundred-thousandths.

2. From one hundred dollars take eight dollars seventeen cents; sixty-two and a half cents; sixty-two cents five mills; one cent and five tenths of a mill; one thousandth of a dollar; five thousandths of a cent.

3. $100.063 + .097 + .09037 + 80.00307 + 30.7093 + .000063$.

4. The French meter measures 39.37079 inches. Find the difference in inches between a yard and a meter.

5. How many rods are there in $28\frac{3}{4}$ rods + 20.7 rods + 8.07 rods + $3\frac{1}{8}$ rods?

6. A man owning 80.08 acres of land sold $6\frac{1}{16}$ acres to one man, and 15.004 acres to another. How many acres had he left?

7. Add .375, 90.07, 294.0083, .00017, and 6.5.

8. Add 6.06, 16.016, 606.6006, 24.0173.

9 Add 10.206, 12, 19.04, 700.07, 96.047.

10. From 3.05 take 2.0075. From 1.1 take .9047.

11. Add 64 and 6 tenths, 7 and 7 thousandths, 200 and 204 ten-thousandths, 8 and 8 tenths.

12. From one hundred and one hundredth take ninety and nine hundred nine ten-thousandths.

13. From 1010 and 101 millionths take 4 and 89 ten-thousandths.

14. From 20 take 9 ten-thousandths.

15. From the sum of 73.5 and .97 take their difference.

16. Add the sum of 40 and 4 hundreths and 57 and 97 thousandths to their difference.

17. $72.015 + 9.6 - 40.0016 + 53.00019$.

18. $100. - .9091 + 4.031 - .236 + 9.005$.

19. $2.0009 - 1.904 + 26.7 + 45.973$.

20. $.6 \times 7 =$ $.06 \times 7 =$ $.006 \times 7 =$ $.9 \times 8 =$ $.19 \times 8 =$

21. $.3 \times .1 =$ $.4 \times 1.6 =$ $.7 \times 1.9 =$ $.01 \times 2.1 =$ $.4 \times 16 =$

22. $.01 \times 1.01 =$ $.09 \times 2.04 =$ $.24 \times 2.6 =$ $.064 \times 9 =$ $.017 \times 1.24 =$

Multiply :	Multiply :	Multiply :
1. 7.3 by 4.9.	6. 9.73 by 250.	11. 8.06 by 1.073.
2. .047 by 7.3.	7. 49.008 by 1.73.	12. .609 by 80.5.
3. 2.094 by 1.9.	8. 26.1 by 1.008.	13. 10.08 by 8.06.
4. 12.064 by 1.024.	9. 400.9 by 20.7.	14. 786 by 1.009.
5. 2.0346 by 7.08.	10. 5.083 by 14.6.	15. .308 by 10.07.

---

16. $.009 \times 1.0647$.	21. 9.047×2.46.	26. 60.08×3.026.
17. $.246 \times 1.00037$.	22. 4.003×2.329.	27. $.086 \times 70.8$.
18. $.75 \times 1.3014$.	23. 20.017×462.	28. 405.7×6.09.
19. 84.008×100.9.	24. 100.9×1.63.	29. $.0008 \times 6000$.
20. $.67 \times 100.4$.	25. 46.84×50.6.	30. 780.9×2.004.

---

31. Multiply .003, .86, .0709, 2.046 by 1.089.

32. Multiply 100, 1.01, .0101, 1.001 by 6.09.

33. Multiply .04, .094, 2.097, .06 by 1.0017.

34. Multiply 4.019 by the product of 6 tenths and 6 thousandths.

35. Multiply the product of 409.097 and 200.9 by 45 ten-thousandths.

36. Multiply .0108 by 10; by 100; by 1.1; by 1.001; by 1000.

37. Multiply 100.04 by 1000; by 1000.001.

38. Multiply .0065 by 100.027; by 10.006; by 1.208; by 40.404; by 2.083.

Multiply :	Multiply :
39. 506.27 by 4.05.	47. 200.96 by 3.07.
40. 8.006 by 100.4.	48. 74.634 by 9.17.
41. .007 by 500.008.	49. 3.06 by 20.02.
42. 10,000 by 1.000084.	50. 400. by 400.4.
43. .0087½ by 10.02.	51. .0867 by 10.101.
44. 2000.9 by 5.46.	52. .003¼ by 62.7.
45. 215.4 by 6.094.	53. .064¾ by 9.006.
46. 64.017 by 700.6.	54. 7.4 by 70.4.

1. 46.73×1.9.
2. 46.943×2.008.
3. 700.14×2.034.
4. 286.9×3.0609.
5. $423.54 \times .7$.
6. 74.021×7.1.
7. 946.09×8.3.
8. 71.4×3.011.
9. 78.008×100.9.
10. 258.01×202.1.
11. 746.09×3.42.
12. 1020.06×102.02.
13. 84.63×7.49.
14. 501.01×2.101.
15. $48.64 \times .00408$.
16. 17.17017×1.87.
17. 900×1.09.
18. 7000×1.0009.
19. 100×1.0946.
20. 5.70×90.901.
21. 80.808×6.04.
22. 407.6×9.308.
23. 162.09×16.
24. 400.063×200.

25. How many yards in 46 pieces of cotton cloth, each piece containing 37.8 yards?

26. Mr. Armstrong sold $\frac{1}{8}$ of his farm for \$906.075. At this rate, what was the value of the whole?

27. An express train travels at the rate of 47.09 miles an hour. How far will it travel in 24.5 hours?

28. A boy had saved \$129.25. He spent .87 of it for a bicycle. What did the bicycle cost?

29. Mr. Rice pays \$32.06 a month for rent. At this rate, what will the rent amount to for 2.7 years?

30. What must I pay for 14.9 yd. of cloth at 97¢ a yard, 4.06 yd. of velvet at \$2.75 a yard, and 43.96 yd. of ribbon at 26¢ a yard?

31. A milkman carries to Boston 497.6 qt. of milk. What should he receive for it at 7¢ a quart?

32. In a factory of 320 hands the average day's pay is \$1.065. What would the pay-roll for one week amount to?

33. At 50¢ a square foot, what is the value of a lot containing 7096.24 sq. ft.?

34. Cost of 846.007 acres of land at \$42.05 an acre?

35. Divide each of the following numbers by 3: .6; .06; .012; 1.2; 10.2; .00012; 10.002; .00102; .0000012.

36. Divide 6 by .3; by .03; by .0003; by 30; by 300; by .00002; by 2000; by .000002; by .002.

37. Divide .012 by 2; by .02; by .0012; by 1.2; by 12; by 120; by .01200; by $.1\frac{1}{3}$; by $.001\frac{1}{4}$.

	Divide 1.	Divide 2.	Divide 3.
a.	16.004 by 20.	60.0075 by .02	8. by .0075
b.	160 by .005	8 by .0075	80.7 by .003
c.	25.032 by .00003	80 by 1060	2.004 by .0003
d.	.00075 by .000½	.903 by 300	20.4 by .08
e.	.081 by .0900	.0016 by 20	.00065 by .015

	Divide 4.	Divide 5.	Divide 6.
a.	2.214 by .019	2 by 1.5	18,507.25 by 2.045
b.	1.294542 by .027	40 by .0025	712.32 by .742
c.	9.7552 by 4.69	400 by .25	41.67 by 900
d.	1.99058 by 7.3	615 by .0075	4167 by 450
e.	38.304 by 456	12,004 by 8.2	80,637.538 by 78.46

	7.	8.	9.
a.	4.8 ÷ 6	3927 ÷ 2.8	35.53 ÷ .017
b.	.048 ÷ .6	392.7 ÷ 2.8	13. ÷ 650
c.	4.8 ÷ .06	39.27 ÷ .28	130 ÷ .065
d.	4.8 ÷ .006	.3927 ÷ .056	3.9382 ÷ .97
e.	48 ÷ .006	.3927 ÷ .0028	246.092 ÷ 470

10. Divide 348.0435 by 865 thousandths.

11. Divide 1901.615 by 95 ten-thousandths.

12. Divide 379.376 by 7 and eight tenths.

13. Divide 3.864 by four hundred twenty.

14. Divide 14,902.086 by 5 and seven ten-thousandths.

	15.	16.	17.
a.	3. ÷ 2.05	218 ÷ 4.02	248.0457 ÷ 0609
b.	4 ÷ 850	420.9 ÷ 30.3	3931.11 ÷ .1409
c.	25 ÷ .05005	72.406 ÷ .132	121.0495 ÷ 7.015
d.	400 ÷ 501.5	4002 ÷ .0204	416,100.3 ÷ 4620
e.	100 ÷ 7.05	5216 ÷ .0105	24,357.632 ÷ 2.704
f.	80 ÷ .0016	32.08 ÷ 1.06	2.86 ÷ .0083
g.	840 ÷ 6.3	1500 ÷ 4.5	100.42 ÷ 640.01

	1.	2.	3.
a.	423.3738 ÷ 906	.040026 ÷ 583	20.1 ÷ 9.067
b.	.054405 ÷ .026	.70243 ÷ .0119	40.5 ÷ .6345
c.	.00045 ÷ 6.35	400.2004 ÷ 8.008	.0409 ÷ .073
d.	475,449.14 ÷ .946	7218.06 ÷ 4.02	.02674 ÷ 4.94
e.	.0737288 ÷ .0092	60,436.24 ÷ 7.017	764.907 ÷ .164

4. At \$0.08 a yard, how many yards of cloth can I buy for \$8? for \$80? for \$8.80?

5. At 0.005 apiece, how many apples can I buy for \$60?

6. At \$.06 a yard, how much cotton cloth can be bought for \$1.20? for \$12? for \$15?

7. At \$.07 a quart, how much milk can I buy for 84¢? for \$1.35? for \$2.24? for \$140?

8. If a boy earns \$.80 a day, how long will it take him to earn \$5.60? to earn \$73.60? to earn \$640?

9. It cost Mr. Chase \$150.50 to concrete a walk 35 yd. long. What did it cost a yard?

10. Divide \$25.20 equally among 6 boys.

11. At the rate of 45 miles an hour, how many hours will it take a man to travel 371.7 miles?

12. An express train was 10.9 hours in going 486.14 miles. What was the rate per hour?

13. How many acres of land can be bought for \$13,975, at \$21.50 an acre?

14. At \$2.75 a pair, how many pairs of shoes can be bought for \$247.50? for \$2200?

15. If 4.7 yd. of cloth are required for a coat, how many coats can be made from 1128 yd. of cloth?

16. In how many days will a man earn \$40.25 if he earns \$1.75 a day? In how many days will he earn \$1060?

17. I have \$156.25. How many cords of wood can be bought for it at \$6.25 a cord?

18. I bought 40.9 yd. of carpet for \$61.35. What was the value of 1 yd.? of 100.5 yd.?

1. How many casks, each holding 9.7 gal., can be filled from 1164 gal. of vinegar?

2. At a ribbon sale, one clerk's receipts were $9671 for ribbon sold at 19¢ a yard. How many yards did he sell?

3. How many tablecloths, each containing 3.5 yd., can be cut from 20.45 yd. of damask?

4. How many cracker-boxes can be filled from 4390.02 lb. of crackers, if each box will hold 8.7̇ lb.?

5. A Western farm containing 3735.75 acres is to be divided into farms of 87.9 acres each. How many farms can be made?

6. At the rate of 96.8 bu. of wheat to an acre, how many acres are required to produce 8508.72 bu.?

7. Change to decimal form: $\frac{1}{2}$; $\frac{3}{4}$; $\frac{1}{8}$; $\frac{5}{8}$; $\frac{7}{8}$; $\frac{6}{16}$.

8. Change to decimal form: $\frac{1}{20}$; $\frac{3}{40}$; $\frac{4}{50}$; $\frac{5}{80}$; $\frac{6}{80}$; $\frac{13}{80}$.

9. Change to decimal form: $\frac{3}{20}$; $\frac{4}{25}$; $\frac{16}{40}$; $\frac{16}{80}$; $\frac{16}{16}$; $\frac{27}{64}$.

10. Change to decimal form: $\frac{7}{8}$; $1\frac{4}{12}$; $\frac{27}{15}$; $\frac{81}{40}$; $\frac{25}{16}$.

11. Change to mixed decimals: $1\frac{3}{4}$; $2\frac{7}{8}$; $14\frac{16}{21}$; $21\frac{15}{16}$; $40\frac{6}{1000}$.

12. Change to mixed decimals: $14\frac{21}{16}$; $20\frac{28}{70}$; $15\frac{17}{32}$; $27\frac{15}{80}$.

Change to common fractions or mixed numbers in their simplest forms:

13. .5; .42; .008; .024; .0875; .0025; 19.125.

14. 14.01875; .01094; 4.06075; .10204.

15. 304.0506; 3.8914; 14.0025; .05005.

16. $.01\frac{1}{4}$; $.00\frac{1}{8}$; $1.0\frac{3}{4}$; $.01\frac{1}{8}$; $.000\frac{1}{2}$; $.008\frac{1}{50}$.

17. $.33\frac{1}{3}$; $.033\frac{1}{3}$; $.06\frac{2}{3}$; $.666\frac{2}{3}$; $0012\frac{1}{2}$; $.0062\frac{1}{2}$.

18. $.00087\frac{1}{2}$; $3.7\frac{2}{3}$; $.0037\frac{1}{2}$; $.08\frac{1}{4}$; $1.2\frac{1}{2}$; $.006\frac{1}{4}$.

19. Change to decimals and add: $\frac{3}{4}$; $\frac{7}{8}$; $\frac{15}{16}$; $\frac{15}{80}$; $\frac{7}{20}$.

20. Change to decimals of three places, and add: $\frac{8}{13}$; $\frac{4}{7}$; $\frac{1}{15}$; $\frac{20}{3}$.

21. Find the sum of 5.009, $.08\frac{1}{3}$, $.9\frac{7}{8}$, and $4\frac{1}{2}$.

22. From $17.07\frac{1}{8}$ take $15\frac{7}{70}$.

23. A barrel of sugar costs 11.66\frac{2}{3}$. What must I pay for $\frac{3}{4}$ of it? for 9.5 bbl.?

24. At $.08\frac{1}{4}$ a yard, how much calico can be bought for $1.20?

1. From a piece of wire netting containing 160.125 ft. there was cut one piece of $19\frac{5}{8}$ yd., another of $24.06\frac{1}{4}$ yd. How many yards left?

2. How many square rods and square feet in .5 A.? .25 A.? .375 A.? $.6\frac{1}{4}$ A.?

3. How many acres, etc., of land in 4.79 A.? $.00\frac{4}{25}$ A.? $38.59\frac{1}{8}$ A.? $9\frac{1}{8}$ A.? and 150.7 A.?

4. From the sum of $1.01\frac{1}{8}$ and $10.100\frac{1}{4}$ take their difference.

5. A walking-club planned to walk a distance of $99.9\frac{3}{8}$ miles. The first day they walk 17.11 mi., the second day $14\frac{5}{8}$ mi., and the third day 15.7 mi. How many miles had they then to walk?

6. What is the cost of 47 bbl. of flour, each 196 lb., at $\$6.14\frac{2}{7}$ for 100 lb.? for 100 bbl. sugar, each 240 lb., at $\$.05\frac{1}{4}$ a pound?

7. At $\$.00\frac{3}{4}$ a pound, what freight must be paid on a carload containing $5\frac{7}{8}$ tons of lead, 3.75 tons of sheet iron, and 7.9375 tons of copper?

8. The gold dollar weighs 25.8 grains, and the silver dollar weighs 412.5 grains. How many pounds, ounces, etc., heavier would a thousand silver dollars weigh than a thousand gold dollars?

9. If the pressure of the atmosphere upon each square inch of surface is 14.75 lb., what will be the pressure upon a surface .75 yd. long and .35 yd. wide?

10. At 63.75¢ apiece, how many Mexican dollars can be bought for \$956.25?

11. By the English system of weights and measures one cubic inch of distilled water, at a temperature of 62° F., weighs 252.458 grains. How much more or less than 1000 oz. does 1 cu. ft. weigh?

12. Change to common fractions in lowest terms: $.3\frac{1}{3}$; $.\dot{6}$; $.\dot{4}\dot{2}$; $.\dot{1}0\dot{8}$; $.0\dot{1}\dot{6}$.

13. Change to decimals and mark the repetends: $\frac{1}{8}$; $\frac{1}{7}$; $\frac{1}{6}$; $\frac{1}{11}$; $\frac{1}{24}$.

14. Change to common fractions in lowest terms: $1.4\dot{6}$; $.0\dot{3}$; $.00\dot{2}\dot{7}$; $.0\dot{1}\dot{6}$; $1.0\dot{6}$.

15. Find the difference between: .6 and $.\dot{6}$; .3 and $.\dot{3}$; $.\dot{1}0\dot{8}$ and .108.

	A.	*B.*	*C.*	*D.*
1.	$\frac{3}{4}$	0.035	4.08	Four hundred sixty and eight hundredths.
2.	$\frac{4}{5}$	.006	6.003	Eighty and seventy-five ten-thousandths.
3.	$\frac{3}{8}$	.035	180.	708 and three thousand six hundred-thousandths.
4.	$\frac{5}{16}$	0.825	6.036	Eight hundred seventy-five hundred-thousandths.
5.	$\frac{5}{8}$	20.206	.0807	Eighty and seventy-six millionths.
6.	$\frac{7}{12}$	8.04	80.043	Ninety-eight ten-thousandths.
7.	$\frac{11}{15}$	.078	3.0009	Seven hundred eight ten-millionths.
8.	$\frac{8}{21}$	.0105	700.8	Six hundred four millionths.
9.	$\frac{17}{24}$	48.06	14.418	One hundred ninety thousandths.
10.	$\frac{18}{30}$	8.076	.08076	450 and eighty-seven millionths.
11.	$\frac{17}{40}$	.0008	3.021	Ten thousand fifty hundred-thousandths.
12.	$\frac{9}{50}$	.705	1.002	Seventy and seventy thousandths.
13.	$\frac{19}{60}$	800.6	.0075	Five hundred forty-five thousandths.
14.	$\frac{15}{75}$	70.008	.207	Eight hundred and seven hundredths.
15.	$\frac{7}{120}$	900.58	30.09	One thousand four and nine thousandths.
16.	$\frac{14}{225}$	70.005	4.008	Three hundred fifty thousand and four tenths.
17.	$\frac{9}{2000}$	1.0006	.2409	Seventy hundred-thousandths.
18.	$\frac{61}{480}$	8.040	.024	Twenty and ten millionths.
19.	$\frac{31}{520}$	.7206	8.0301	Forty-eight and seventy thousandths.
20.	$\frac{2}{1860}$	1.008	100.80	Seven hundred and fifty hundredths.

1. Read the numbers expressed in *B*; in *C*.
2. Write in figures the numbers expressed in *D*.
3. Change *A* to decimals (four places).
4. Change *B* to common fractions in lowest terms.
5. Add *B* and *C*.
6. Add *A* and *B*.
7. Add *A* and *C*.
8. Add *B* and *D*.
9. Add *C* and *D*.
10. Add *A* and *D*.
11. Find the difference between *B* and *C*.
12. Find the difference between *B* and *D*.
13. Find the difference between *C* and *D*.
14. Multiply *B* by 10.
15. Multiply *B* by 1000.
16. Multiply *C* by 18.
17. Multiply *D* by .01.
18. Multiply *D* by .109.
19. Multiply *B* by *C*.
20. Multiply *B* by *D*.
21. Divide *B* by 10.
22. Divide *C* by .1.
23. Divide *D* by 100.
24. Divide *D* by .001.
25. Divide *C* by .03.
26. Divide *B* by .0005.
27. Divide *C* by *B*.

1. Find the sum of five hundred and 6 thousandths, fifty and 9 hundredths, five and 9 ten-thousandths, seventy-two and 9 tenths. eight hundred twenty-one and 16 thousandths.

2. From five and 6 hundredths take three and 75 ten-thousandths. Multiply the result by 2.46.

3. A farmer sold 48.39 acres of land, and then had 189.6¾ acres. How many acres did he have at first?

4. Add ¼ of 14.4 and ⅗ of 19.5, and subtract from the sum the product of 5×1.09.

5. If 1 yd. of calico is sold for 9 cents, how many yards may be bought for \$1.93½? for \$.85½? for \$7.62$\frac{3}{10}$? for \$1⅓?

6. How much ribbon at 24¢ a yard can be bought for \$4.20? for \$26.06? What will 30.7 yd. cost?

7. At \$6.25 a ton, how much coal will pay for 12½ tons of hay at \$14.35 a ton?

8. When 19 bales of cotton are sold for \$1609.14, what is 1 bale worth? 4.9 bales? 200.6 bales?

9. Multiply the sum of 40.009 and 16.5007 by the difference between 9.001 and 8.709.

10. What is the cost of 39.49 tons of iron at \$28¾ a ton? If it is carried a distance of 439 miles, what are the freight charges at the rate of 1⅕¢ a ton for a mile?

11. At the rate of 3.789 miles an hour, how many days will it take a man to walk 632.763 miles, if he walks 5 hours a day?

12. Mr. Wright's estate is valued at \$87,096. .35 of it is invested in real estate, and .20 of it is deposited in banks. How much money in each?

13. If 3.5 yd. of silk costs \$9.73, what will 16.7 yd. cost? What will .7 yd. cost?

14. In 6.5 days a man earns \$12.35. How long will it take him to earn \$125 at the same wages?

15. From a flock of 600 sheep, .27 of them were sold at \$8.35 a head, and the rest at \$9¼ a head. How much was received for all?

16. How much land at 37.5¢ a foot can be bought for \$10,000? How much at \$.08⅓ a foot?

1. What will it cost to paper a room, using $13\frac{1}{2}$ rolls of paper at $20\frac{3}{4}¢$ a roll, and $17\frac{1}{2}$ yd. of bordering at \$.075 a yard? (Use decimals.)

2. A spool of thread contains about 198.7 yd. How many spools can be filled from 9537.6 yd.?

3. A merchant buys 24 pieces of cotton cloth, each containing 42.75 yd., and pays \$.06$\frac{3}{4}$ a yard. What is his gain, if he sells two pieces at the rate of \$.075 a yard, and the rest at \$.08$\frac{1}{4}$ a yard?

4. A farmer's wife exchanged 30 dozen eggs at $27\frac{1}{2}¢$ a dozen, for flour at \$5.50 a barrel. How many barrels should she receive?

5. If a glass of soda water costs a druggist $2\frac{1}{4}¢$, and he sells it for \$.05 how much does he gain on 325 glasses?

6. If a paper of pins containing 250 pins costs $5¢$, what is the value of a pin? How many could be bought for \$50?

7. A farmer raised 823.9 bu. of oats on 15 acres of land. At the same rate, what would 26.7 acres produce?

8. Find the cost of 4850 laths at $45¢$ a hundred; of 8706 pickets at \$11.50 a thousand.

9. A real estate agent collected \$946.45, and received $4\frac{1}{2}¢$ for every dollar collected. How much did he receive?

10. Find the cost of $23\frac{1}{4}$ yd. of ribbon @ \$.23$\frac{1}{4}$ a yard.

11. Find the cost of 4.25 doz. tomato plants @ $3¢$ apiece.

12. If I add the product of 9.16 and 54.907 to 43.033, and from this sum subtract 188.09273, what will the remainder be?

13. Mr. Bond made a barbed wire fence of three wires, 62.375 rd. long. What was the cost of wire at $14\frac{1}{2}¢$ a rd.?

14. The weekly pay-roll of a factory amounted to \$7318.50. If the average wages is \$1.75 a day, how many employees are there in the factory?

15. Mr. Williams sold 650 acres of land at \$25.75 an acre. He invested the proceeds in sugar at \$12.25 a barrel. How many barrels did he buy?

16. It cost \$30,937.50 to grade a road at \$10.3125 a rod. How long is the road?

SECTION V.

MENSURATION.

Oral and Written Exercises.

1. Estimate and measure in feet and inches the length and width of your teacher's desk; width of blackboard; height of door; height of room.

2. Name points that you think are 10 yd. apart; 50 yd; 10 rd. 20 rd.; 40 rd.; ½ mi. Measure by pacing these distances, to show how near to the actual distance your estimate was.

3. How many rods in a mile? How many yards? How many feet?

4. In 2 mi. 6 rd. how many yards? How many feet?

5. In 6 rd. 3 ft. how many feet? How many inches?

6. In 58 in. how many feet and inches?

7. In 140 in. how many feet and inches?

8. In 53 in. how many yards, feet, and inches?

9. In 542 in. how many yards, feet, and inches?

10. How many miles and feet in 10,000 ft.?

11. How many miles, rods, and yards in 5000 yd.?

12. What part of a mile is 88 yd.? 528 ft.?

13. How many miles and rods in 648 rd.?

14. Reduce 4 yd. 2 ft. to feet; to inches.

15. Reduce 3 yd. 1 ft. 8 in. to inches.

16. Reduce 1 rd. 4 yd. to yards; to feet.

17. Reduce 6 rd. 3 yd. 2 ft. to feet.

18. Reduce 2 rd. 6 ft. to feet; to inches.

19. Reduce 18 rd. 4 yd. 2 ft. to inches.

20. How many feet in 160 rods 14 ft.?

21. In 2 mi. 26 rd. how many feet?

22. At the rate of 10 rd. a minute, how many miles and rods can a boy walk in an hour? How many miles?

1. A horse goes a distance of 30 miles in 5 h. 20 min. How many miles does he go an hour?

2. How many paces, each 30 in. long, would one have to take to go 40 rd.? to go 1 mile?

3. A train passes 15 telegraph poles every minute. If the distance between the poles is 60 yd., how many miles an hour is the train going?

4. How many paces, each 32 in. long, must one take to go $\frac{3}{4}$ of a mile?

5. The difference of time between the flash and report of a gun was 3 seconds. How many rods away was the gun, sound travelling at the rate of 1090 ft. a second?

6. If between a flash of lightning and the thunder following there are 8 seconds, how far away is the thunder-cloud?

7. A wheel 9 ft. 6 in. in circumference must turn round how many times in going $\frac{3}{5}$ of a mile?

8. A man built on Monday 4 rd. 12 ft. of fence; on Tuesday, 3 rd. 6 ft.; on Wednesday, 3 rd. 4 ft.; on Thursday, 4 rd. $1\frac{1}{2}$ yd. How many rods, etc., did he build during the four days? How much did he receive at $37\frac{1}{2}¢$ a rod?

9. What will 14.16 rd. of wire cost at $2\frac{1}{2}¢$ a yard?

10. I paid \$5.60 for a coil of rope measuring $93.3\frac{1}{3}$ yd. What should I pay at the same rate for 600 ft. of rope?

11. 80 lengths of a surveyor's chain make 1 mile. How many feet long is the chain? How many inches long?

12. If there are 100 links in the chain, how many inches long is each link?

13. Fill blanks in the following table:

— in. = 1 link (li.)
— li. = 1 chain (ch.)
— ch. = 1 mile (mi.)

14. How many chains in 2 mi.? in 8 mi.?

15. How many links in 6 ch.? in 20 ch.?

16. How many feet in 1 ch.? in 6 ch.?

1. How many inches in 50 li. ? in 78 li. ?
2. How many chains in 500 li. ? in 8000 li. ?
3. Reduce to inches 4 ch. 62 li. How many feet ?
4. How many chains in 6 mi. 18 ch. ? How many feet ?
5. Reduce to links 1 mi. 26 ch. How many inches ?
6. Reduce to inches 89 ch. 14 li. 6 in.
7. How many links and inches in 20 in. ? in 50 in. ?
8. How many links and inches in 140 in. ? in 600 in. ?
9. How many chains and links in 240 li. ? in 680 li. ?
10. How many chains and links in 1684 li. ? in 4728 li. ?
11. How many chains, links, and inches in 850 in.? in 1000 in.?
12. Reduce to higher denominations 1650 li.
13. Reduce to higher denominations: 190 in. ; 1800 in.
14. A road 4 rd. long measures how many chains ?
15. A road 48 rd. long measures how many chains ?
16. A lot of land 8 ch. 20 li. long is how many feet long ?
17. A bicycler rode a distance measuring 40 ch. in $2\frac{1}{2}$ minutes. How many feet did he go a minute ?
18. A race-course measures 42 ch. 60 li. How many feet long is it ? What part of a mile ? If a horse trots round the track in 2 minutes, what part of a mile does he trot in 1 minute ? How many minutes would it take him to trot a mile at the same rate ?
19. A horse trots around a track measuring 28 ch. 40 li. in 56 seconds. How long at the same rate would it take him to go a mile ? What part of a mile does he go in a minute ?
20. Draw and describe a right angle ; an acute angle ; an obtuse angle.
21. Draw and describe a triangle ; a quadrangle or quadrilateral; a pentagon ; a hexagon ; a heptagon ; an octagon.
22. Draw and describe a right triangle ; an acute triangle ; an obtuse triangle.
23. Draw and describe a rectangle. Show by drawing how to find the area.
24. Draw a diagram representing a rectangle containing 64 sq. in.; 144 sq. in. ; 90 sq. in.

1. Draw a diagram representing a rectangle containing 1 sq. ft.; 20 sq. ft.; 84 sq. ft.; 834 sq. ft.

2. How many square feet in the floor of a room containing 288 sq. in.? 1440 sq. in.? 2000 sq. in.?

3. Draw a diagram representing a surface containing 6 sq. yd.; 24 sq. yd.; 84 sq. yd.; 804 sq. yd.

4. How many square feet in 8 sq. yd.? 42 sq. yd.?

5. How many square yards in 36 sq. ft.? 108 sq. ft.?

6. How many square yards and square feet in 40 sq. ft.? 100 sq. ft.? 260 sq. ft.? 500 sq. ft.?

7. In 142.6 sq. yd. how many square feet?

8. How many square inches in 4 sq. ft.? 28 sq. ft.?

9. How many square feet and square inches in 200 sq. in.? 1000 sq. in.?

10. How many square yards in a floor 6 yd. square?

11. How many square yards in a lot of land 1 rd. square? (Draw a diagram and make 1 sq. rd. = — sq. yd.)

12. How many square feet in 1 sq. rd.? in $18\frac{3}{4}$ sq. rd.?

13. How many square yards in a rectangle 3 rd. long, 1 rd. wide?

14. How many square yards in a rectangle 4 rd. long, 20 yd. wide?

15. How many square yards in a rectangular field $3\frac{1}{2}$ rd. long, 60 ft. wide? (Draw figure as near as you can to a scale of 1 rd. to an inch.)

16. How many square rods in a field containing 100 sq. yd.?

17. How many square rods and square yards in a rectangular field 50 yd. long, 30 yd. wide?

18. How many square rods in a rectangular field 8 rd. long, 4 rd. wide? 200 ft. long, 80 ft. wide?

19. How many square rods in a rectangular field 20 rd. long and 8 rd. wide? Draw plan of this field, also of other fields containing the same number of square rods. In each of these fields there is 1 acre. — sq. rd. = 1 A.

20. How many acres in a field containing 320 sq. rd.?

21. How many acres in a field that is 80 rd. long, 12 rd. wide? 185 rd. long, 46 rd. wide? 1000 ft. long, 22 rd. wide?

1. How many acres in a field 40 rd. square?

2. How many acres and square rods in a rectangular field 20 rd. long and 15 rd. wide?

3. How many acres and square rods in a rectangular field $28\frac{3}{8}$ rd. long and 20 rd. wide?

4. A field containing $\frac{3}{5}$ of an acre contains how many square rods? How many square yards?

5. A rectangular field 6 ch. long, 4 ch. wide, contains how many square feet?

6. How many square feet in a rectangular field 16 ch. 80 li. long and 8 ch. wide? How many acres?

7. How many square feet in a rectangular field 26.84 ch. long and 12.18 ch. wide? How many acres?

8. A floor containing 12 sq. yd. is 9 ft. wide. How long is it?

9. A rectangular lot containing 15 sq. rd. is 90 ft. long. How wide is it?

10. How many yards of carpet 30 in. wide will it take to cover a floor containing 18 sq. yd.?

11. How wide must a board 12 ft. 6 in. long be to contain 8 sq. ft.?

12 $\frac{1}{2}$ an acre of land is worth what, at $3\frac{1}{2}$¢ a square foot?

13. At the rate of $160 an acre, how much do I pay for a lot of land 8 rd. square?

14. A rectangular lot of land is 120 ft. 6 in. long and 48 ft. wide. How many square yards in the lot? How many yards around the outside? How many square feet in a path 2 ft. wide, extending lengthwise of the lot? (Draw plan.)

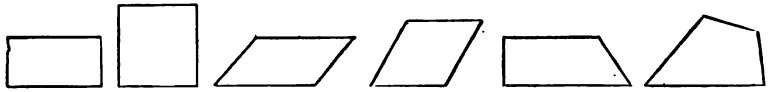
15. A roll of paper which contains 18 sq. yd. and is 30 in. wide is how long? How many rolls of such paper will it take to cover the walls of a room 12 ft. square on the floor and 9 ft. high?

16. What will it cost to concrete a sidewalk 132 ft. 5 in. long and 4 ft. wide at 65¢ a square yard?

17. How much cloth $\frac{3}{4}$ of a yard wide will it take to line $16\frac{1}{2}$ yd. of velvet $\frac{1}{2}$ a yard wide?

18. A rectangular lot of land is 384 ft. long and 192 ft. wide. What will it cost at the rate of $500 an acre?

1. Draw and describe a horizontal line; a vertical line.
2. Draw parallel lines in different directions.



3. The first four figures above are parallelograms. Tell in what respect they are alike.
4. Describe as to angles and sides: rectangle; square; rhomboid; rhombus; trapezoid; trapezium.
5. Show by diagram how to find the area of a rhomboid.
6. Show by diagram how to find the area of a trapezoid.
7. Show by diagram that the area of a triangle is equal to half the area of a parallelogram of the same base and altitude.
8. A garden in the form of a parallelogram has a length of 24 ft. and an altitude of 18 ft. What is the area in square feet? (Draw plan.)
9. A triangular field whose length at the base is 120 ft. and whose altitude is 90 ft. contains how many square feet?
10. A field in the form of a parallelogram contains 48 sq. rd. and is 8 rd. long. What is the altitude?
11. What is the altitude of a triangle 28 ft. long which contains 140 sq. ft.?
12. What is the length of a road 30 ft. wide which contains 6 acres?
13. How many square feet in a square chain?
14. How many square chains in an acre?
15. What part of a rod is $8\frac{1}{4}$ ft.? $1\frac{1}{3}$ yd.? 6 in.?
16. What part of a chain is 40 li.? 25 ft.? 54.5 ft.?
17. Reduce to the decimal of a mile: 80 rd.; 6 rd.; $18\frac{3}{4}$ rd.?
18. Reduce to the decimal of a mile: 40 ft.; 860 ft.; 1790 ft.
19. What part of an acre is 40 sq. rd.? 5 sq. rd.? 180 sq. ft.?
20. Reduce to the decimal of an acre: 30.25 sq. yd.; 140 sq. rd.
21. Reduce to the decimal of a square rod 54.45 sq. yd.

1. Reduce to the decimal of an acre: 60 sq. rd.; 500 sq. ft.
Fill out blanks in the following table:

Form of Surface.	Base.	Altitude.	Area of Surface.
Parallelogram.	20 ft.	16 ft.	— sq. ft.
Triangle.	30 ft.	6 ft.	— sq. ft.
Parallelogram.	12 ft. 8 in.	8 ft.	— sq. ft.
Parallelogram.	$6\frac{2}{3}$ yd.	— yd.	20 sq. yd.
Triangle.	— in.	8 in.	16 sq. in.
Parallelogram.	24 ft. 6 in.	15 ft. 8 in.	— sq. yd.
Triangle.	$6\frac{2}{3}$ yd.	8 ft. 4 in.	— sq. ft.
Parallelogram.	$18\frac{1}{2}$ rd.	$6\frac{2}{3}$ rd.	— sq. rd.
Parallelogram.	50 rd.	20 rd.	— A., etc.
Parallelogram.	28 rd. 10 ft.	16 rd. 12 ft.	— A., etc.
Parallelogram.	1 mi.	20 rd.	— A., etc.
Triangle.	45 rd.	20 rd.	— A., etc.
Parallelogram.	42 rd.	——	1 acre.
Parallelogram.	— rd., etc.	$16\frac{1}{2}$ rd.	$2\frac{1}{2}$ acres.
Parallelogram.	— rd., etc.	500 ft.	3 A. 120 sq. rd.
Parallelogram.	48 ch. 20 li.	26 ch. 40 li.	— sq. ft.

2. At $100 an acre, what will 40 sq. rd. of land cost? 96 sq. rd.? 250 sq. rd.?

3. What will a rectangular piece of land 42 rd. long, 18 rd. wide, cost at $80 an acre?

4. A rectangular piece of land measures 18 rd. 12 ft. long and 150 ft. wide. What is it worth at $2\frac{1}{2}$¢ a square foot?

5. A piece of land in the form of a rectangle is 68 ch. 18 li. long and 44 ch. 15 li. wide. What is it worth at the rate of $240 an acre?

6. I bought 128 sq. rd. of land for $174.24. What did I pay for it a square foot?

7. I bought $2\frac{1}{2}$ A. of land at $300 an acre, and sold it at $1\frac{1}{4}$¢ a square foot. What was the gain or loss?

1. A room 18 ft. by 12 ft. 6 in. will require how many square yards of carpet to cover the floor? What would be the most economical way of placing the carpet? How long must the carpet be if it is 1 yd. wide? if it is $\frac{2}{3}$ yd. wide?

2. A floor 18 ft. long, 10 ft. wide, has a painted border 2 ft. wide around the room. How many square yards in the border? How many square yards unpainted? (Draw plan.)

3. How long is a rectangular field which is 20 rd. wide and contains 600 sq. rd.?

4. A room which requires 20 sq. yd. of carpet to cover the floor is 18 ft. long. How wide is it?

5. How many yards of carpet 30 in. wide will it take to cover a floor 18 ft. 6 in. by 12 ft.?

6. How wide must a board 12 ft. 6 in. long be to contain 8 sq. ft.?

7. One course or layer of boards 42 in. wide and $10\frac{1}{2}$ ft. long contains how many square feet?

8. Boxboards 50 in. long are laid in courses 8 ft. long. There are 28 courses. How many square feet? How much are they worth at the rate of $12.50 a thousand square feet?

9. How many courses 8 ft. long, 50 in. wide, will it take to make 1 M. of boards? to make 4850 sq. ft.?

10. A rectangular lot of land has 180 "front feet" on the street, and is 250 ft. deep. Which would be the cheaper price, 12¢ a square foot, or $31 a front foot? How much cheaper?

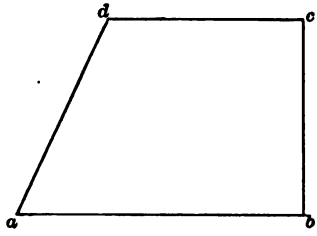
11. At $7\frac{1}{2}$¢ a square foot, what will it cost to prepare for use a blackboard 16 ft. 8 in. long, 4 ft. 3 in. wide?

12. How many bricks 8 in. × 4 in. × 2 in. laid flatwise, will it take to cover a surface containing 96 sq. in.? 320 sq. in.? How many more if placed edgewise?

13. How many square yards of paper will it take to cover the walls of a room 15 ft. × 12 ft. × 9 ft., no allowance for openings?

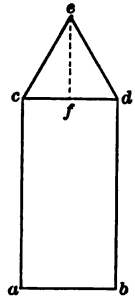
14. What is the area of a rectangular field 26.34 ch. long, 15.18 ch. wide?

15. How much will it cost to cement a cellar bottom 22 ft. 8 in. long by 16 ft. 7 in. wide at 85¢ a square yard?



1. The above figure is drawn on a scale of 12 feet to an inch. Find the number of square feet.

2. This represents the gable end of a house 12 ft. wide (*ab*), and 24 ft. high to the roof (*ac*). The line *ef* is 12 ft. How many square feet in the end? If the house is 40 ft. long, how many square feet of boards will it take to inclose the sides and ends, not allowing for windows and doors?



3. Draw the gable end of a house on a certain scale, and find the number of square feet.

4. Draw the plan of a lot of land containing 180 sq. rd. on a scale of 30 rods to an inch. How many yards of fencing will it take to inclose it? How much is the lot worth at 5¢ a square foot?

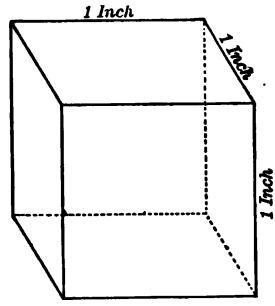
5. Draw on any scale a lot containing an acre. How much will it cost to fence it at the rate of 20¢ a yard? What is the lot worth at ½¢ a foot?

6. Draw a polygon of any number of sides, and show how you can get the area.

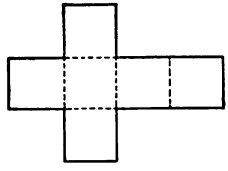
7. Supposing the figures on page 60 to be drawn on a scale of a rod to ⅛ of an inch, find the area of each.

8. How many square feet of boards will it take to cover the gable ends of a house 32 ft. wide, 40 feet high to the ridge pole, and 28 ft. high to the eaves? (Draw plan.)

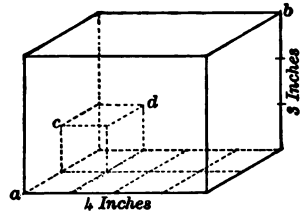
9. How many square feet of boards will it take to cover the roof and sides of the above house, the roof being 20 ft. wide, and the house and roof being 46 ft. long?



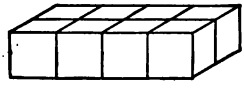
1. The above figure represents a cubic inch. Make from a piece of wood, clay, or putty a cube of the same size; or cut thick paper in the form here given, making each side four times as long. Fold together in the form of a cube. How many faces has the cube? How does the size of the faces compare? What is the form of the faces? How many edges has the cube? Name all the things you have seen in the form of a cube.



2. Pile cubical blocks together, making a rectangular solid 4 in. long, 2 in. wide, 3 in. high. How many cubic inches in the pile?



3. Let *ab* represent the pile; *cd* represents 1 block measuring a cubic inch. The lower layer of blocks has how many rows and how many blocks in a row? 4 cu. in. × 2 = — cu. in. How many layers? The number of cubic inches in *ab* is 4 cu. in. × 2 × 3 = — cu. in.



4. How may we find the cubic contents of all rectangular solids?

1. How many cubic inches in a block 4 in. long, 3 in. wide, and 5 in. high? (The blocks and other solids referred to in this section are rectangular solids.)

2. How many cubic inches in a block 1 ft. long, 1 ft. wide, and 1 ft. high? Such a block is called a cubic foot (cu. ft.). — cu. in. = 1 cu. ft.

3. How many cubic feet in a solid 4 ft. long, 3 ft. wide, and 2 ft. high? How many cubic inches?

4. How many cubic inches in a block 6 ft. long, 2 ft. wide, and 1 ft. high?

5. How many cubic inches in a block 3 ft. 6 in. long, 18 in. wide, and 6 in. high? How many cubic feet?

6. How many cubic inches in a block of stone measuring 1 ft. 4 in. in each direction?

7. How many cubic feet in a solid 6 ft. square at the base and 2 ft. high?

8. The pedestal of a monument is a rectangular solid 4 ft. high, 6 ft. 6 in. long, and 6 ft. 6 in. wide. How many cubic feet in it?

9. A cubical block 1 yd. in length, width, and height is a cubic yard. How many cubic feet? — cu. ft. = 1 cu. yd.

10. How many cubic yards in a block containing 216 cu. ft.? 540 cu. ft.? 94.8 cu. ft.?

11. How many cubic yards and cubic feet in a block containing 400 cu. ft.? 640 cu. ft.?

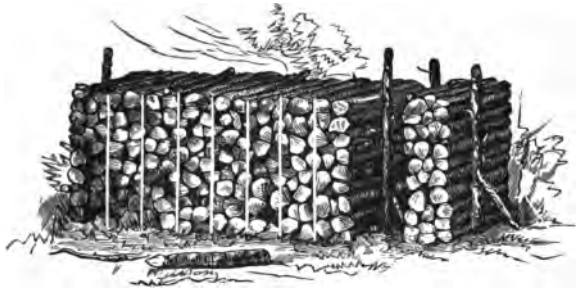
12. How many cubic feet and cubic inches in a block containing 4000 cu. in.? 12,080 cu. in.? .85 cu. yd.?

13. How many cubic inches in a block containing $\frac{2}{3}$ cu. ft.? $\frac{3}{4}$ cu. ft.? $\frac{1}{2}$ cu. yd.?

14. What part of a cubic foot is 144 cu. in.? 648 cu. in.?

15. How many cubic inches in a box 8 in. long, 6 in. wide, and 4 in. high? If the boards are $\frac{1}{2}$ in. thick, what are the dimensions of the inside of the box? How many cubic inches in the inside?

16. How many square inches in the outside surface of the box given in the last problem? How many square inches of paper would it take to cover the inside of the box?



1 Cord. 1 Cord Foot.

1. A pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high is called a cord. A cord foot is $\frac{1}{8}$ of a cord.

— cu. ft. = 1 cord (cd.)
— cd. ft. = 1 cord
– cu. ft. = 1 cd. ft.

2. Draw a picture of $\frac{1}{2}$ cord; of 3 cord feet.

3. How many cubic feet in $\frac{1}{2}$ cd.? $\frac{3}{8}$ cd.? 6 cd. ft.?

4. How many cubic feet in $\frac{5}{8}$ cd.? $3\frac{1}{2}$ cd. ft.? $5\frac{1}{2}$ cd. ft.?

5. How many cord feet in 64 cu. ft.? 100 cu. ft.? 3 cd.?

6. What part of a cord is 2 cd. ft.? $3\frac{1}{2}$ cd. ft.? 96 cu. ft.?

7. How many cords in 10 cd. ft.? 200 cu. ft.? 480 cu. ft.?

8. A pile of wood 4 ft. long, 4 ft. wide, 4 ft. high is what part of a cord? What is it worth at $6.25 a cord?

9. A pile of wood 2 rd. long, 4 ft. wide, and 3 ft. high has how many cubic feet? cord feet? cords?

10. A room 12 ft. long, 8 ft. wide, 9 ft. high is filled with wood. What is the wood worth at $6 a cord?

11. At $1.60 a cubic yard, what will it cost to dig a cellar 20 ft. 6 in. long, 18 ft. wide, and 6 ft. 3 in. deep?

12. How many packages, each containing 18 cu. in., can be packed in a box 4 ft. 4 in. long, 2 ft. wide, and $1\frac{1}{2}$ ft. high?

13. How many papers of tacks, each $2\frac{1}{2}$ in. × $1\frac{1}{2}$ in. × $1\frac{1}{4}$ in., can be packed in a box containing $5\frac{1}{2}$ cu. ft.?

1. How many pickets 2 in. wide will be required to make a fence 4 rd. long, if the pickets are placed $1\frac{1}{2}$ in. apart? How many for a fence half a mile long? How many for a fence inclosing a lot of land 60 ft. long, 30 ft. wide?

2. What is the difference in size between a lot of land 6 rods square and a lot containing 6 square rods? (Draw plans of the two lots.)

3. How many strips of carpet 27 in. wide will it take to cover a floor 12 ft. wide? If the floor is 14 ft. long, how many yards of carpet will be needed?

4. What will be the cost of fencing a square lot of land whose sides are 8 rods, at $14\frac{1}{2}$¢ a foot?

5. How long must a lot of land 80 ft. wide be to contain 30 sq. rd.? to contain an acre?

6. The perimeter of a rectangular lot of land is 380 ft. If the lot is 40 ft. wide, how long is it? How many square rods in the lot?

7. How much will it cost to spade a triangular lot of land whose base is 180 ft. and altitude 62 ft., at 4¢ a square yard?

8. How many posts are required for a fence inclosing a lot of land 170 ft. long, 85 ft. wide, if the posts are set 8 ft. 6 in. apart? How many 2-inch pickets will be required for the fence if they are placed 2 inches apart?

9. I have a lawn in the form of a rectangle 18 yd. 1 ft. long and 27 ft. 8 in. wide. There is a walk 3 ft. 6 in. wide surrounding the lawn. How much did it cost to sod the lawn at 12¢ a square yard? How many square feet in the walk? How much more did the fence surrounding the walk cost than the fence surrounding the lawn, the cost of the fence being 18¢ a yard? (Draw plan of lawn and walk.)

10. Reckoning a bushel to measure $1\frac{1}{4}$ cubic feet, how many bushels of grain can be put into a bin 8 ft. 6 in. long, 6 ft. 3 in. wide, and 4 ft. 8 in. high?

11. Each side of a barn roof is 48 ft. 6 in. by 18 ft. 3 in. How many square feet of boards will be required for covering?

12. At $14.50 per M., what will 450 feet of boards cost?

1. In a school-room 32 ft. long, 28 ft. wide, and 12 ft. 8 in. high there are 45 pupils. How many cubic feet of space for each pupil?

2. If I pay $20 for a pile of wood 2½ rd. long, 4 ft. wide, and 4 ft. high, what do I pay per cord?

3. How many cords of wood can I pile in a building 9 ft. 3 in. long, 8 ft. wide, and 10 ft. high?

4. The Manufactures Building in the Columbian Exposition was 1687 ft. long and 787 ft. wide. How many acres of ground did it cover? It covered how many times as much surface as the Capitol at Washington, which is 751 ft. long and 324 ft. wide?

5. How many lots 100 ft. square can be made from an acre of land? How many lots 185 ft. 6 in. long and 120 ft. wide can be made from 8½ A.?

6. If a cubic foot of coal weighs 93.75 lb., how large a box would it take to hold a ton?

7. My bin is 28 ft. 6 in. long, 6 ft. wide, and 4 ft. deep. How many tons of coal will it hold? What will it cost to fill the bin with coal at $5.50 a ton?

Find by measurement:

8. The square yards in the floor of your school-room.

9. The square rods in your school-house lot.

10. The number of yards of fence it will take to inclose the school-house lot.

11. The number of cords one of the anterooms will contain.

12. The square yards of blackboard surface in your school-room.

13. The square yards of floor surface in your sitting-room at home; the square yards of wall surface.

Make original problems about:

14. The cost of laying a floor in your school-room.

15. The cost of painting the blackboards.

16. The cost of building a fence around the school-house lot.

17. Carpeting the floor of one of your rooms at home.

18. Shingling the roof of the school-house.

19. Buying or selling a piece of land that you have measured.

SECTION VI.

DENOMINATE NUMBERS AND BUSINESS TRANSACTIONS.

Oral and Written Exercises.

1. What United States coins are made of silver? of nickel? of bronze? of gold?

2. What pieces of money could be taken to make \$4.84? \$3.94? \$6.74? \$7.46 \$12.81? \$36.13?

3. Add together 4 half-dollars, 8 ten-cent pieces, 3 nickels, and 4 cents.

4. How many cents in $\$\frac{3}{4}$? $\$\frac{1}{8}$? $\$\frac{3}{8}$? $\$\frac{5}{8}$? $\$\frac{7}{8}$?

5. How many cents in $\$\frac{1}{3}$? $\$\frac{2}{3}$? $\$\frac{1}{6}$? $\$\frac{5}{6}$? $\$\frac{1}{12}$? $\$\frac{5}{12}$?

6. What part of a dollar is $16\frac{2}{3}¢$? $37\frac{1}{2}¢$? $33\frac{1}{3}¢$? $62\frac{1}{2}¢$? $87\frac{1}{2}¢$? $83\frac{1}{3}¢$? $8\frac{1}{3}¢$? $41\frac{2}{3}¢$?

7. What will 12 yd. of cloth cost at $8\frac{1}{3}¢$ a yard? at $16\frac{2}{3}¢$? at $37\frac{1}{2}¢$? at $87\frac{1}{2}¢$? at $66\frac{2}{3}¢$?

8. How many yards of cloth can I buy for \$6 at $33\frac{1}{3}¢$ a yard? at $66\frac{2}{3}¢$? at $12\frac{1}{2}¢$? at $62\frac{1}{2}¢$? at $87\frac{1}{2}¢$?

9. At $16\frac{2}{3}¢$ each, how many plates can I buy for \$3? for $\$4\frac{1}{2}$? for $\$5\frac{1}{3}$? for $75¢$? for \$1.25?

10. From \$1 subtract $12¢$; $18¢$; $32¢$; $64¢$; $73¢$; $58¢$; $46¢$; $28¢$; $49¢$; $31¢$; $83¢$; $77¢$; $59¢$; $19¢$; $67¢$; $38¢$.

11. If an English sovereign or pound is worth \$4.86, how much is a shilling, or $\frac{1}{20}$ of a pound, worth? How much of our money can be exchanged for two crowns, or five-shilling pieces? How much at the above rate must I pay for a ten-pound note, 3 crowns, and a shilling?

12. How much of our money is a penny, or $\frac{1}{12}$ of a shilling, worth? a sixpence? £4 10*s.*? 8*s.* 4*d.*?

13. How many pounds can I get for \$30, and how much of United States currency left over?

1. What part of a pound can I get for 50¢? for $2? for $4.25?
2. How many shillings can I get for $1? for $3.20?
3. How many pounds and shillings can I get for $10? $26.80?
4. How many shillings and pence can I get for $3? for $4.25?
5. Change at the above rate $25 to the currency of England.
6. Reduce to feet: $\frac{2}{3}$ yd.; $\frac{3}{4}$ yd.; $\frac{5}{6}$ yd.; $\frac{7}{12}$ yd.; $\frac{4}{5}$ yd.
7. How many inches in $\frac{3}{4}$ ft.? $\frac{5}{6}$ ft.? $\frac{5}{8}$ ft.? $\frac{5}{12}$ ft.? $\frac{3}{16}$ ft.?

Fill blanks in the following exercises:

8. rd. = yd.	9. rd. = ft.	10. lb. = oz.	11. gal. = qt.
$\frac{1}{2}$ = —	$\frac{1}{2}$ = —	$\frac{1}{8}$ = —	$\frac{1}{8}$ = —
$\frac{2}{3}$ = —	$\frac{1}{3}$ = —	$\frac{3}{8}$ = —	$\frac{4}{5}$ = —
$1\frac{3}{4}$ = —	$1\frac{2}{3}$ = —	$\frac{3}{5}$ = —	$\frac{7}{8}$ = —
.25 = —	.75 = —	$2\frac{5}{8}$ = —	$\frac{4}{9}$ = —
1.8 = —	1.25 = —	1.75 = —	$1\frac{5}{6}$ = —

12. qt. = gl.	13. bu. = pk.	14. pk. = qt.	15. yr. = mo.
$\frac{1}{3}$ = —	$\frac{3}{4}$ = —	$\frac{3}{4}$ = —	$\frac{5}{6}$ = —
$\frac{3}{5}$ = —	$\frac{2}{3}$ = —	$\frac{5}{6}$ = —	$\frac{3}{8}$ = —
$1\frac{3}{4}$ = —	$1\frac{1}{2}$ = —	$\frac{3}{7}$ = —	$\frac{4}{5}$ = —
$3\frac{3}{8}$ = —	$1\frac{2}{3}$ = —	$1\frac{2}{3}$ = —	$1\frac{3}{8}$ = —
2.9 = —	2.125 = —	$3.12\frac{1}{2}$ = —	$1.8\frac{1}{3}$ = —

16. wk. = d.	17. d. = h.	18. h. = min.	19. min. = sec.
$\frac{2}{3}$ = —	$\frac{3}{4}$ = —	$\frac{3}{4}$ = —	$\frac{5}{6}$ = —
$1\frac{3}{7}$ = —	$\frac{5}{6}$ = —	$\frac{4}{5}$ = —	$1\frac{2}{3}$ = —
$1\frac{5}{8}$ = —	$\frac{7}{10}$ = —	$1\frac{2}{3}$ = —	$3\frac{1}{2}$ = —
$2\frac{3}{4}$ = —	$1\frac{7}{9}$ = —	$3\frac{1}{5}$ = —	6.3 = —
$3.87\frac{1}{2}$ = —	$4.37\frac{1}{2}$ = —	5.09 = —	2.25 = —

20. I bought 8 lb. of tea at $62\frac{1}{2}$¢ a pound. Gave a five-dollar bill. What change?

21. I gave a ten-dollar bill for 12 yd. of cloth at $62\frac{1}{2}$¢ a yard. What change?

22. If 3 pk. of potatoes cost 60¢, what will a bushel cost?

1. At the rate of 15 lb. for a dollar, what will $6\frac{3}{8}$ lb. of sugar cost?

2. If I pay 80¢ for $4\frac{1}{2}$ lb. of beef, how much will $8\frac{1}{8}$ lb. cost at the same rate?

3. At \$18 a thousand, what will 6500 feet of boards cost?

4. What will $18\frac{1}{2}$ M. shingles cost at \$4.25 a thousand?

5. What cost 28,250 bricks at \$8.25 a thousand?

6. I buy 6840 roofing slates for \$60 a thousand, and sell them at the rate of \$7.80 a hundred. What was my profit?

7. If a horse eats 10 qt. of oats every day, how many bushels will he eat during the month of September? If 32 lb. are reckoned as a bushel, how long will it take him to eat a quarter of a ton?

8. If a piece of beef weighing $6\frac{3}{4}$ lb. costs \$1.62, what should I pay for a piece weighing $10\frac{1}{4}$ lb.?

9. A man commenced work on Wednesday, February 1, 1893, at \$1.75 a day. He worked until the evening of May 3, having lost $2\frac{3}{4}$ days on account of sickness. He paid for board \$4.50 a week, for clothing \$12.50, and for miscellaneous expenses \$10.60. What did he save from his earnings from February 1 to May 3?

10. Find the total wages of each man named in the following weekly time-sheets. (The figures indicate the number of hours that each man worked, 10 hours counted as a day's work.)

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Rate per day.
John Brown,	$10\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$7\frac{1}{2}$	\$1.75
Cyrus Eaton,	10	8	$7\frac{3}{4}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$7\frac{1}{2}$	1.62
Wm. Black,	$6\frac{3}{4}$	$8\frac{1}{2}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$9\frac{3}{4}$	5	1.75
Ezra Fuller,	$10\frac{1}{2}$	$3\frac{1}{4}$	$7\frac{3}{4}$	$10\frac{1}{2}$	5	$7\frac{1}{2}$	1.87
Jas. O'Connell,	$10\frac{1}{2}$	$10\frac{1}{2}$	$5\frac{3}{4}$	$8\frac{3}{4}$	$10\frac{1}{2}$	$7\frac{1}{2}$	1.87
Thos. Smith,	$6\frac{1}{4}$	$10\frac{1}{2}$	$10\frac{1}{2}$	$4\frac{1}{4}$	$8\frac{3}{4}$	$7\frac{1}{2}$	2.25

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Rate per day.
A. Smith,	8	8	$4\frac{3}{4}$	10	10	10	\$2.25
G. Hall,	7	10	10	$6\frac{1}{4}$	10	$8\frac{3}{4}$	2.25
S. Woods,	10	$6\frac{1}{4}$	$5\frac{1}{2}$	10	10	$3\frac{3}{4}$	2.50
T. Kelley,	10	10	$6\frac{3}{4}$	10	$7\frac{1}{4}$	$8\frac{1}{2}$	2.25
J. Reed,	8	$7\frac{1}{4}$	10	10	10	$3\frac{1}{4}$	1.75

1. At \$.085 a pound, what will 100 lb. of beef cost? 50 lb.? 20 lb.? 75 lb.? 186 lb. 10 oz.?

2. If 1 bbl. of flour costs \$6.25, what will 10 bbl. cost? 100 bbl.? 50 bbl.? 25 bbl.?

3. If 100 bu. of wheat cost \$67.50, what costs 1 bu.?

4. If 50 bu. apples cost \$24, what costs 1 bu.? 80 bu.? 60 bu.?

5. At the rate of \$7.50 a hundredweight, what will 20 lb. of beef cost? 60 lb.? 75 lb.?

6. If a man receives \$1.75 for a day's work, how much will he receive for 100 days' work? 20 da.? 80 da.? 75 da.?

7. 40 bbl. of apples can be bought for \$144. What will 1 bbl. cost at the same rate? 100 bbl.? 50 bbl.? 75 bbl.?

8. A merchant bought 8 gross of pens at \$1.20 a gross, and sold them at 18¢ a dozen. What was the gain?

9. A merchant pays \$3 for 8 pails full of berries. If each pail holds 7½ quarts, and he gets 12¢ a quart, what is the profit?

10. At \$4.00 a bushel, what will 3 pk. and 3 qt. of berries cost?

11. At \$24 a ton, what must I pay for 16 cwt. of hay?

12. A load of hay with the wagon weighs 2680 lb. If the wagon weighs 420 lb., what is the value of the hay at \$18 a ton?

13. If it takes 18 qt. of milk to yield a pound of butter, how much butter may be made from 15 gallons of milk? How many gallons of milk will it take to yield 15 lb. 4 oz. of butter?

14. Mr. Brown has 16 cows, each of which gives an average of 11 qt. 1 pt. of milk a day. 14½ qt. are sold daily, and the family uses an average of 2 qt. a day. How much butter can be made from the rest, if it takes 16 qt. of milk to make a pound of butter?

15. 5760 grains make a pound of gold or silver. 7000 grains make a pound of nearly all other materials. A pound of silver is what fractional part as heavy as a pound of beef?

16. How many gold dollars would it take to make a pound, each gold dollar weighing 25.8 grains?

17. If the silver dollar weighs 412½ grains, how many pounds and ounces would 80 silver dollars weigh? How many silver dollars could a man lift, if he could lift only 100 lb.?

1. $\frac{1}{20}$ of an ounce of gold or silver is called a pennyweight (pwt.). How many pennyweights in an ounce? How many grains in 1 pwt.?

2. Reduce 8000 grains of gold to pounds, etc.

3. Reduce to grains: 6 pwt.; 6 oz. 4 pwt.; 1 lb. 14 pwt.

4. How many spoons can be made from 2 lb. 4 oz. of silver, if each spoon weighs 18 pwt.?

5. The gallon, liquid measure, contains 231 cu. in. How many cubic inches in a quart?

6. The quart, dry measure, contains 67.2 cu. in. 10 quarts dry measure equal how many quarts liquid measure?

7. How many cubic inches in a bushel? in a peck? in 6 bu. 3 pk.? in 2 bu. 3 pk. 4 qt.?

8. How many quarts of corn can be put into a box 2 ft. long, 8 in. wide, 6 in. deep?

9. A bin 8 ft. 6 in. long, 4 ft. 3 in. wide, and 12 ft. deep holds how many bushels of wheat?

10. How many gallons of water will a cistern hold that contains 80 cu. ft.? 416 cu. ft.? $9\frac{2}{3}$ cu. ft.?

11. A tank 20 ft. 6 in. long, 15 ft. wide, and 8 ft. 3 in. deep holds how many gallons?

12. A barrel of kerosene oil generally contains 42 gallons, and a barrel of beer 36 gallons. The kerosene barrel is how many cubic inches larger than the beer barrel?

13. How many quarts of milk can be put into a bushel measure?

14. If berries are measured by the liquid quart, how much is a customer cheated in buying 10 qt.?

15. Reduce to gills: .5 pt.; .5 qt.; .75 qt.; .5 gal.

16. Reduce to quarts: .25 pk.; .5 bu.; .25 bu.

17. How many ounces of meat in .5 lb.? .75 lb.?

18. How many pounds in .25 cwt.? in .625 T?

Reduce to lower denominations:

19. .6 gal.; .35 gal.; .625 gal.; .45 qt.; .37$\frac{1}{2}$ qt.

20. .8 bu.; .875 bu.; .375 bu.; 1.28 pk.; 2.08 bu.

Reduce to lower denominations:

1. .5 wk.; .25 wk.; .75 da.; .085 da.; .018 yr.
2. .05 T.; .625 cwt.; .008 T.; .45 lb.; .095 cwt.
3. .25 yd.; .25 rd.; .08 rd.; .34 mi.; .83 ch.
4. .25 sq. yd.; .8 sq. rd.; .5 A.; .375 A.; .18 A.
5. .45 A.; .08 A.; .035 A.; .006 A.; $1\frac{1}{8}$ A.

Reduce to higher denominations:

6. 80 qt.; 13 pt.; 123 gi.; 187 pt.; 813 qt.
7. 13 pk.; 67 qt.; 323 pk.; 137 pt.; 317 qt.
8. 60*s.*; 312*s.*; 42*d.*; 816*d.*; 2143*d.*
9. 14 da.; 315 da.; 718 min.; 6200 sec.
10. 800 lb.; 614 lb.; 74 cwt.; 1963 lb.
11. 81 ft.; 22 yd.; 612 in.; 8464 ft.
12. 864 sq. in.; 207 sq. ft.; 242 sq. yd.

13. What decimal of a pound is 8 oz.? 4 oz.? 12 oz.? 15 oz.?
14. What decimal of a ton is 5 cwt.? 8 cwt.? 250 lb.? 850 lb.? 1680 lb.? 25 lb.?
15. Reduce to decimal of a gallon: 3 qt. 1 pt.; 2 qt. 3 gi.
16. Reduce to decimal of a ton: 600 lb.; 824 lb.
17. Reduce to decimal of a pound: 4*s.* 6*d.*; 12*s.* 3*d.*
18. Reduce to decimal of a rod: $4\frac{1}{2}$ ft.; 2 yd. 9 in.
19. Reduce to decimal of a mile: 20 rd.; 8 rd. 12 ft.
20. Reduce to decimal of an acre: 16 sq. rd.; 165 sq. ft.
21. .75 yr. = — mo. 3 mo. = — yr.
22. .05 T. = — lb. 125 cwt. = — lb.
23. 28 lb. = — cwt. 145 lb. = — T.
24. 75 da. = — yr. .018 yr. = — da.
25. 180 ft. = — mi. 40 yd. = — mi.
26. .06 sq. yd. = — sq. ft. .8 A. = — sq. ft.
27. .75 cd. = — cu. ft. 486 cu. ft. = — cd.
28. 300 lb. = — T. 20 lb. 8 oz. = — cwt.
29. 9 cwt. 18 lb. = — T. 6.8 T. = — lb.

Find the cost of:

1. $8\frac{3}{4}$ cwt. of meat at 6¢ a pound.
2. 2.28 T. of coal at $62\frac{1}{2}$¢ a hundredweight.
3. 2400 sq. ft. of land at $1200 an acre.
4. .8 A. of land at 10¢ a square foot.
5. 450 sq. rd. of land at $200 an acre.
6. 4.75 gross of pens at 8¢ a dozen.
7. 18 yd. 2 ft. 6 in. of wire at 8¢ a yard.
8. What will 8 lb. 6 oz. of meat cost at 24¢ a pound? 9 lb. 3 oz. at 30¢? 6 lb. 14 oz. at 25¢? 11 lb. 5 oz. at 28¢?
9. A quarter of beef weighed 326 lb. 8 oz. What is it worth at $10.50 a hundredweight?
10. I bought a load of hay weighing 1 T. 3 cwt. 25 lb. at $18 a ton. What did I pay?
11. At 30¢ per cwt., what shall I pay for 1480 lb. of hay?
12. What will 8 gal. 2 qt. of molasses cost at 35¢ a gallon? 4 gal. 3 qt. at 40¢? 6 gal. 2 qt. 1 pt. at 50¢? 18 gal. 1 pt. at 48¢?
13. I bought 6 bbl. of vinegar, each barrel holding 36 gal. 1 qt. What did I pay for it at 18¢ a gallon?
14. From a barrel of kerosene containing 42 gal. there was sold at one time 18 gal. 3 qt. 1 pt. and at another time 12 gal. 2 qt. What was the remainder worth at 9¢ a gallon?
15. You sell a horse and carriage to Wm. Robinson for $325, and give him a receipt for the price paid. Fill out the following blank:

$\$$..... .... *189*

Received from .....

..... 100 *Dollars,*

.....

.....

16. Suppose he had paid you $200 down, how would you fill out the receipt?

1. Make out a receipt for payment of monthly rent, the place to be this town or city, and the date to-day.

2. Make the proper entries in the following cash account. Balance the account, and begin a new one:

	CASH.	Dr.		Cr.	
1893.					
Sept. 3	*Amount on hand,*	*$48*	*65*		
" "	*Paid C. Lamb for grain,*			*$1*	*87*
" "	" *Mrs. W. for sundries,*			*4*	*00*
" *4*	*Received 12¼ lb. fowl @ 18¢,*				
" *6*	*Paid W. L. Garrison, groceries,*			*2*	*07*
" "	" *Cobb, 3½ bu. apples @ 42¢,*				
" *7*	*Received 18½ doz. eggs @ 26¢,*				
" "	*Paid Howells, meat, 5 lb.,*				*90*
" *8*	" *shoes $2.50, and suit $18.50,*			*21*	*00*
" *9*	*Received week's wages,*	*10*	*50*		
" "	*Paid Garrison for grain,*			*3*	*42*
" "	*Balance,*				
Sept. 11	*Amount on hand,*				

3. Rule a ledger for cash account. Make proper entries, and balance for the following example:

J. Brown, a carpenter, has on hand, Jan. 1, 1894, $76.30. He receives during the month: Jan. 3, $6.30, repairing doors for L. Hayward; Jan. 13, $14.80 from F. Morse, for labor; Jan. 16, $3.20, G. Morton, for labor; Jan. 25, S. Ring, $18.50, for labor; Jan. 30, $4 from S. Bradford, for labor. He pays out: Jan. 6, for groceries, $3.20; for meat, $2.80; Jan. 13, for groceries, $2.70; for meat, etc., $3.10; for clothes, $8.40; Jan. 20, groceries, $1.60; for meat, etc., $3.60; Jan. 27, groceries, $3.15; for meat, $2.80; for sundries, $2.50. Balance the account Jan. 31.

1. Make out in proper form a cash account, giving the following items: S. Cole has on hand, Monday, Feb. 5, 1894, $1106.70. He pays out the following sums during the week: Monday, 206 bu. corn @ 68¢; 115 bu. oats @ 35¢; Tuesday, 18 bbl. of flour @ $5.40; Wednesday, $14, F. Jones, for labor; $18, house expenses; Thursday, $24 for clothing; S. Brown, $26, on account; Saturday, wife's allowance, $10; groceries, etc., $6.80. He receives: Monday's sales, 21 bu. corn @ 80¢, 26 bu. oats @ 50¢, and 3 bbl. of flour @ $6.25; Tuesday's sales, 32 bu. corn @ 80¢, and 6 bbl. flour @ $6.25; Wednesday's sales, 28 bu. corn @ 78¢, and 24 bu. oats @ 48¢; Thursday's sales, 15 bu. corn @ 78¢, and 26 bu. oats @ 48¢; Friday's sales, 34 bu. corn @ 78¢, 6 bbl. flour @ $6.25, 17 bu. oats @ 48¢; Saturday's sales, 64 bu. corn @ 78¢, 3 bbl. flour @ $6.25, and 48 bu. oats @ 48¢. Balance the account Saturday night, and begin a new account for the following Monday.

2. James L. Cobb, a farmer, has on hand, Monday, $86.40. On that day he pays out for groceries $2.12, and receives for vegetables $1.87 and 75¢. On Tuesday he receives for ploughing S. Brown's field $3.40, and for grain $2.60. On Wednesday he pays $1.36 for seed and $6.30 for clothing. He receives $3.20 for potatoes. On Thursday he pays 75¢ for shoeing horse and $1.25 for setting tires. On Friday he sells for cash $8\frac{1}{3}$ doz. eggs at 28¢ a dozen, and 18 lb. 9 oz. of chickens at 18¢ a pound. On Saturday he pays for meat $2.25, and receives $1.50 for the use of horse and carriage. Make cash account for the week, and begin a new account for the following Monday.

3. A clerk's weekly salary is $18. During one week he bought for cash $1\frac{1}{4}$ lb. steak @ 18¢; 13 lb. sugar @ $6\frac{1}{2}$¢; 1 pk. 2 qt. apples @ 25¢ a peck; $8\frac{1}{4}$ yd. cloth @ $33\frac{1}{3}$ ¢; $4\frac{3}{4}$ lb. meat @ 14¢; 1 bu. potatoes, 55¢; 5 gal. K. oil @ 11¢; $3\frac{1}{2}$ lb. fish @ 9¢; $6\frac{1}{2}$ lb. oatmeal @ 6¢. Make a cash account in full, giving the amount on hand at the beginning of the following week.

4. Make a cash account such as a blacksmith might keep who has a shop and hired man.

5. Make a cash account such as a landlord of a hotel might keep.

1. Copy, fill out, and receipt as clerk the following bill:

Mr. A. S. Walker. *Worcester, Oct. 1, 1893.*

Bought of C. L. MACOMBER & CO.

Dealers in Wood, Coal, Hay, Grain, etc.

Sept.	*20*	*12¼ T. Coal*	*@ $6.25,*		
"	"	*6 ft. Kindling*	*@ 1.25,*		
"	*25*	*18 bu. Corn*	*@ .75,*		

Write bills of following sales. Make the place your own town or city, and the date to-day:

2. You sell James P. Brown 18¾ bu. apples at 67½¢ a bushel, and 12 bu. 3 pk. of potatoes at 75¢ a bushel.

3. You sell Amos T. White 1 bbl. vinegar (36¾ gal.) at 13¢ a gallon, and 8 cd. 6 cd. ft. of wood at $5.75 a cord.

4. As clerk for a country merchant you sell to William Black goods as given in the following bill. Fill out and properly sign:

.....*189*

Mr......

To JOSEPH WHITE, *Dr.*

		24 yd. Muslin	*@ 9¢,*		
		8 yd. Ribbon	*@ 42¢,*		
		3 doz. Buttons	*@ 25¢,*		

1. Explain and fill out the following bill :

Jonesville, Jan. 1, 1894.

Mr. James B. Mills.

To AMOS S. HARRIS & CO., *Dr.*

1893.					
Sept.	*6*	*To 12 bbl. Flour @ $6.25,*			
Oct.	*16*	*" 160 bu. Wheat @ .83,*			
Nov.	*1*	*" 80 bu. Corn @ .75,*			
		Cr.			
Oct.	*2*	*By 186 doz. Eggs @ 18¢,*			
Nov.	*1*	*" Cash,*	*$50.00*		
Dec.	*1*	*" 146 lb. Beef @ 12½¢,*			
		Balance due,			

Received payment,

.....

2. Make out a bill for working 8½ days for John Brown at $1.75 a day. He pays you but $10 of the amount due and asks for a receipt. Fill it out in proper form.

3. James Brown, dry goods dealer, sells Thomas Waterman 8½ yd. sheeting at 25¢; 6 doz. buttons at 18¢ a dozen; 18 yd. satinet at 87½¢ a yard; 3 blankets for $8. Mr. Waterman sells Mr. Brown 2 cd. 3 cd. ft. of wood at $6 a cord, and pays the balance he owes him in money. As clerk for Mr. Brown, make out the bill.

4. May 1, 1892, S. L. Carter bought of G. S. Griffin 4840 lb. of hay, for which he was to pay at the rate of $22 a ton. He pays $10 down, and one month later $20. Make out a bill such as was given May 1. Settlement was made June 1. Make out a bill such as was signed June 1.

1. Jan. 18, 1893, Wm. S. Thompson bought of Albert Simmons a cow for $60, with the understanding that he was to pay in labor at 25¢ an hour. He worked Jan. 20, 8½ hours; Jan. 21, 6⅛ hours; Jan. 23, 9¼ hours; Jan. 24, 7¾ hours; Jan. 25, 8 h. 20 min.; Jan. 26, 7 h. 40 min.; Jan. 27, 8 h. 15 min.; Jan. 31, 6 h. 50 min. Make a bill such as Mr. Simmons would make Feb. 1, crediting Mr. Thompson with work done.

2. Sept. 15, 1889, Mr. P. Scott, of Anthony, Kansas, ordered of Rankin, Dutch & Co., of Kansas City, 18 bbl. of flour @ $5.37½; 220 bu. corn @ 48¢; 360 bu. oats @ 37½¢. Write a letter ordering the goods. Write a bill for the goods. Write a receipt for $200 paid Oct. 1 on account. Settlement was made Nov. 1. Make out bill in full.

3. S. L. Childs buys of Asa Howland 3 T. 680 lb. coal @ $5.50 a ton; 18 cd. 3½ cd. ft. of wood at $6.50 a cord. Howland buys of Childs at different times 18½ yd. of cloth @ 75¢; 16¼ lb. butter @ 30¢; 8¾ lb. cheese @ 11¢; 2½ lb. coffee @ 34¢; a barrel of flour for $5.67; 18 lb. sugar @ 6½¢; 3 gal. 3 qt. of molasses @ 45¢ a gallon. How does the account stand at the end of these transactions? Make out bill or receipt such as would be given when settlement is made.

4. The wages of workmen in a certain factory are $1.75 a day of nine hours, and 25¢ an hour overtime. How much will a man earn in a week if he works each day from 6.30 A.M. to 9 P.M., 2 hours out for meals? If there are 120 men in the factory, what does the pay-roll amount to for the week?

5. A fruit-dealer bought 18 baskets of peaches at 62½¢ a basket, and 12 bu. apples at 40¢ a bushel. Allowing 2½ baskets of peaches and 1¼ bu. of apples for waste, how much will he gain by retailing the peaches at 10¢ a dozen, and the apples at 15¢ a peck, there being an average of 135 peaches to a basket?

6. Imagine that you are a dealer in dry goods or groceries, and that you sell various articles at different times to James Brown, who pays you a sum of money on account. Make out a bill including all transactions.

SECTION VII.

Miscellaneous Oral and Written Exercises.

Add the following ledger columns :

1.	2.	3.	4.
$4086.75	$468.37	$506.35	$74.83
734.09	2009.16	4206.84	683.15
1806.17	317.48	917.75	42.78
29.56	69.17	69.38	5.69
3.74	709.69	5.94	6.84
484.93	42.39	786.32	1965.38
3900.78	4689.74	80.09	4872.49
589.00	870.09	9.74	837.65
34.09	58.65	2608.31	74.09
8.67	806.74	726.49	8.78
907.14	17.48	37.08	783.29
23.46	1965.37	148.72	450.96
48.74	374.27	69.54	87.06
498.56	48.46	3269.74	1243.80
80.39	905.39	158.28	586.26
1.08	74.85	7.42	35.75
1864.70	8.94	96.39	6.49
308.97	6203.56	589.15	486.39
54.23	568.34	86.37	48.34

5. 58×200 ; 63×400 ; 87×8000 ; 75×5000.
6. 850×50 ; 624×25 ; 428×125 ; 840×75.
7. $48 \times 3\frac{1}{8}$; $75 \times 3\frac{1}{8}$; $81 \times 33\frac{1}{3}$; $450 \times 33\frac{1}{3}$.
8. $24 \times 2\frac{1}{2}$; $48 \times 2\frac{1}{2}$; $60 \times 16\frac{2}{3}$; $72 \times 16\frac{2}{3}$.
9. $36 \times 66\frac{2}{3}$; $54 \times 66\frac{2}{3}$; $28 \times 1\frac{3}{7}$; $40 \times 14\frac{2}{7}$.
10. $864 \div 50$; $784 \div 25$; $350 \div 12\frac{1}{2}$; $846 \div 12\frac{1}{2}$.

1. $48 \div 33\frac{1}{3}$; $75 \div 33\frac{1}{3}$; $40 \div 16\frac{2}{3}$; $85 \div 16\frac{2}{3}$.
2. $470 \div 125$; $846 \div 125$; $50 \div 1\frac{3}{7}$; $80 \div 14\frac{2}{7}$.
3. 96×97; 88×99; 97×95; 94×96.
4. 93×98; 87×96; 85×94; 95×87.
5. 996×994; 987×992; 986×995; 983×998.
6. 36×44; 48×52; 67×73; 84×96.
7. 75×85; 91×109; 194×206; 1020×980.
8. 48×48; 82×42; 64×84; 89×79.
9. 2462×11; 8342×31; 7894×61.
10. 4897×401; 8634×105; 8662×18.
11. $6\frac{1}{2} \times 6\frac{1}{2}$; $8\frac{1}{8} \times 8\frac{1}{8}$; $12\frac{1}{4} \times 12\frac{1}{4}$; $15\frac{1}{2} \times 15\frac{1}{2}$.
12. $5\frac{1}{2} \times 12\frac{1}{2}$; $6\frac{1}{2} \times 9\frac{1}{2}$; $8\frac{1}{2} \times 6\frac{1}{2}$; $14\frac{1}{2} \times 8\frac{1}{2}$.
13. $4\frac{3}{4} \times 6\frac{1}{4}$; $9\frac{1}{8} \times 7\frac{3}{8}$; $3\frac{5}{8} \times 6\frac{3}{8}$; $4\frac{1}{8} \times 8\frac{5}{8}$.

Give the proper change in each of the following transactions:

	Sold.	Received.
14.	2 lb. tea @ $62\frac{1}{2}$ ¢; $6\frac{1}{2}$ lb. sugar @ 8¢.	$5.00.
15.	$3\frac{1}{2}$ lb. lard @ 14¢; $2\frac{1}{2}$ lb. soap @ 12¢.	1.00.
16.	$8\frac{1}{4}$ yd. cloth @ 25¢; 9 yd. ribbon @ 22¢.	5.00.
17.	4 lb. starch @ 14¢; 3 lb. coffee @ 35¢.	2.00.
18.	$6\frac{1}{2}$ bu. apples @ 62¢; 3 bu. potatoes @ $62\frac{1}{2}$¢.	10.00.
19.	$8\frac{1}{4}$ lb. beef @ 22¢; $16\frac{1}{2}$ lb. lard @ 9¢.	5.00.

Find the amount of the following bills of sale:

20. 321 lb. butter @ 22¢; 426 lb. cheese @ 14¢.
21. 420 doz. eggs @ 18¢; 64 bu. potatoes @ $62\frac{1}{2}$¢.
22. 328 bu. wheat @ $1.10; 242 bu. corn @ 82¢.
23. 483 bu. oats @ 45¢; 84 bu. barley @ 95¢.
24. 87 pr. overshoes @ 72¢; 86 pr. slippers @ $1.20.
25. 64 pr. boots @ $3.50; 68 pr. gaiters @ 38¢.

26. If a family uses 3 pt. of milk a day, what will be the milk bill for the quarter ending June 30? Price of milk 7¢ a quart.

27. A man bought during the year 5 loads of hay weighing respectively: 1 T. 350 lb.; 1860 lb.; 1 T. 640 lb.; 1920 lb.; 1 T. 1290 lb. What did it all cost at $18 a ton?

Find the amount of each of the following sales, and the total amount of all:

1. 600 lb. of coal at $6.40 a ton.
2. 180 lb. 10 oz. of beef at $12.00 a hundredweight.
3. 18 cd. 2 cd. ft. of wood at $6.50 a cord.
4. 76 gal. 3 qt. of molasses at 14¢ a quart.
5. 16 bu. 3 pk. 5 qt. of strawberries at $1.20 a peck.
6. 1800 sheets of paper at $1.80 a ream.
7. 150 lb. of flour at $6 a barrel (196 lb.).
8. 500 eggs at 28¢ a dozen.

9. If brass is $\frac{1}{8}$ as heavy as water, and iron is 7.6 times as heavy as water, how many times as heavy as brass is iron?

10. The specific gravity of lead is 11.35, and of platinum wire 21.041. Platinum wire is how many times as heavy as lead?

11. A can do a piece of work in 6 da.; B can do it in 4 da. What part of the work can A do in 1 da.? What part can B do in 1 da.? What part can both do in 1 da.? How many days will it take both to do it?

12. If it takes a man $2\frac{1}{2}$ da. to do a piece of work, how much of it can he do in 1 da.?

13. A and B together can build a wall in 6 da. A alone can build it in 9 da. How long will it take B to build it?

14. James has 10 cents, which is $\frac{2}{5}$ as much as Robert has. How much has Robert?

15. A man spent $\frac{1}{2}$ of his month's wages for board, $\frac{1}{8}$ of it for clothing, and had $15 left. What wages did he receive monthly?

16. $\frac{1}{8}$ of $\frac{1}{8}$ of the height of the Washington monument is 37 ft. What is the height of the monument?

17. A man owns $\frac{3}{8}$ of a factory, and sells $\frac{1}{4}$ of his share for $8500. What is the factory worth?

18. A man gave $\frac{3}{8}$ of his estate to his wife, and the remainder was divided among his four sons. The difference between the wife's share and one son's share was $4500. What was the value of the estate, and what was each person's share?

1. A freight train going at the rate of 15 mi. an hour is 2 mi. ahead of a passenger train going at the rate of 25 mi. an hour. How many miles does the passenger train gain on the freight train in one minute? How long will it take the passenger train to overtake the freight train?

2. If a lamp, by burning 4 hours each evening, burns a gallon of kerosene in 3 weeks, how many gallons a week will be needed for a house in which 8 lamps are burned 4 hours each evening? If the 8 lamps continue to be used on an average of 3 hours an evening, how long will a barrel of 42 gallons last? If the average is $2\frac{1}{2}$ hours an evening, how long will a barrel last?

3. If an acre of land yields $125\frac{1}{2}$ bu. of potatoes, how many acres and square rods will it take to yield 4000 bushels?

4. If 12 lb. of grass seed are required to plant an acre, how much will be required for a rectangular lawn 10 rd. long, 140 ft. wide?

5. If 8 bu. of potatoes are required to plant an acre, how much land can be planted with $\frac{1}{2}$ pk.? with 10 bu. 6 pk.?

6. My gas meter shows that 19,800 ft. of gas have been burned during the past quarter. What must I pay at the rate of $1.60 a thousand feet?

7. In Massachusetts there are in one bushel of oats 30 lb., which is $\frac{5}{7}$ as many pounds as make a bushel in Iowa, and $\frac{5}{6}$ as many pounds as make a bushel in most other States. How many pounds in the bushel in Iowa, and how many in most other States?

8. If a bushel of wheat weighs 60 lb., how many bushels of oats in Massachusetts will weigh as much as $103\frac{5}{8}$ bu. of wheat?

9. How many lengths $6\frac{2}{3}$ ft. each are there in a fence 120 rd. long?

10. A flight of stairs has 18 steps, each having a tread of 9 in. and a rise of 7 in. What will the stair carpet cost at 80¢ a yard?

11. How many rods of fence will it take to inclose a field 37 rd. long, 26 rd. wide? (Draw plan.)

12. At $2\frac{1}{2}$¢ a yard, what will 4 rd. of wire fencing cost? How much will a twenty-rod fence of 4 wires cost? With the same fence, what will it cost to inclose a lot of land 40 rd. long by 150 ft. wide?

1. How many telegraph poles 12 rd. apart are there in a mile?

2. How many posts 12 ft. apart will be needed to inclose a lot of land 240 ft. long and 180 ft. wide?

3. How many posts 6 ft. apart will be needed to inclose a half-acre lot of land 132 ft. wide?

4. How many 2-inch pickets placed 2 inches apart will be required to inclose the above lot?

5. How many paving stones 8 inches square will it take to pave a street 2 rd. long and 40 ft. wide?

6. How many sheets of tin 12 in. by 20 in. will it take to cover two sides of a roof each 24 ft. 6 in. by 13 ft. 6 in., no allowance for waste?

7. If 192 cu. ft. of wood cost $9.00, what is the price per cord?

8. If $12.80 is paid for a pile of wood 15 ft. 6 in. long, 4 ft. wide, 3 ft. 6 in. high, what is the price per cord?

9. How many trees can be planted on an acre of land, if 300 sq. ft. are allowed for each tree?

10. There are — sq. yd. in 1 sq. rd. How many square rods in 100 sq. yd.?

11. There are — sq. ft. in 1 sq. rd. How many square rods in a piece of land 400 ft. long and 100 ft. wide?

12. How many barrels of sugar in a ton, each barrel weighing $242\frac{1}{2}$ pounds?

13. A railroad train went $86\frac{2}{3}$ miles in $2\frac{3}{4}$ hours. How many miles an hour did it go on the average?

14. If a train runs $\frac{7}{10}$ of a mile a minute, how many minutes will it take to run $48\frac{2}{3}$ miles?

15. A man builds $3\frac{3}{4}$ rd. of picket-fence in a day. How long will it take him to build a fence around a lot 100 ft. sq.?

16. A barrel of beef weighing 200 lb. cost $16\frac{2}{3}$. What was the cost per pound?

17. At $\frac{5}{8}$ of a cent apiece, how many dozen eggs can I buy for $60?

18. At $0.125 a yard, what will 200 yd. of cloth cost?

19. How many pints in 2.06 bushels?

1. A piece of land 12.25 rd. long and 2.04 rd. wide contains how many square rods?

2. 4 sq. rd. is what decimal of an acre?

3. A load of hay weighs 2460 lb. The cart weighs 680 lb. What is the hay worth at $18 a ton?

4. If a factory uses 8.4 T. of iron a week, how many pounds will it use in a day? At $60 a ton, how much will the iron cost that will be needed during the first six months of the year?

5. What will it cost to carry 18 T. of iron from New York to Chicago, a distance of 970 miles, at the rate of $1\frac{1}{8}¢$ per ton for a mile?

6. If a basket holds $\frac{3}{8}$ of a peck of corn, how many basketfuls in a bushel? How many in a bin full which holds 50 bushels?

7. If $1\frac{1}{2}$ qt. of fruit will fill a jar, how many jars will be required for a barrel containing $2\frac{1}{2}$ bushels?

8. A room is 14 ft. 3 in. long and 10 ft. 6 in. wide. What will it cost to paint the floor at 20¢ a square yard?

9. At the rate of $\$\frac{1}{3}$ an hour, how much will a man earn in 18 days 3 hours, reckoning 8 hours as the working day?

10. If $\frac{2}{3}$ of an acre of land is worth $45, what are $12\frac{1}{3}$ acres worth at the same rate?

11. From a piece of cloth measuring $45\frac{1}{2}$ yd. there were sold $36\frac{3}{8}$ yd. What was the value of the remainder at $\$1\frac{1}{2}$ a yard?

12. How many times will an $8\frac{1}{2}$-gallon can of oil fill a lamp that holds $\frac{3}{8}$ of a pint?

13. How many yards of cloth 1 yd. wide will line $15\frac{1}{2}$ sq. yd. of cloth? How many yards $\frac{3}{4}$ yd. wide? How many $\frac{2}{3}$ yd. wide?

14. How many yards of carpet 30 in. wide will it take to carpet a room 15 ft. 6 in. long, 10 ft. 8 in. wide, no allowance for waste?

15. How many boards 9 ft. 3 in. long, 6 in. wide will it take for a floor 18 ft. 6 in. long, 14 ft. wide?

16. How many planks 10 ft. 6 in. long, 8 in. wide will it take to lay a sidewalk 53 rd. 12 ft. 6 in. long and 6 ft. 8 in. wide?

17. A quart (dry measure) contains 67.2 cu. in. How many cubic inches in a bushel? in 8 bu. 16 qt.?

1. How many bushels of wheat will fill a box containing 6 cu. ft. ?

2. How many bushels of wheat will fill a bin 15 ft. 6 in. long, 4 ft. 6 in. wide, and 6 ft. deep ? How many pounds does the wheat weigh, allowing 60 lb. to a bushel ?

3. If floating ice has 7 times as much of it under the surface of the water as above it, what part is above water ? If an iceberg is 50 ft. above water, what is the entire height of the iceberg ? How high above water would an iceberg 300 ft. high have to be ?

4. If I buy lemons at the rate of 3 for 5 cents and sell them at the rate of 2 for 5 cents, how much do I gain on the sale of 60 lemons?

5. I pay 60 cents for some apples at the rate of 2 for 3 cents and sell them at the rate of 2 cents apiece. What is the gain?

6. A farm is valued at $3000, which is $2\frac{1}{2}$ times the value of the farm-house. What is the value of the farm-house ?

7. A man sold a horse and carriage for $350, receiving $\frac{1}{4}$ as much for the carriage as for the horse. What did he sell each for?

8. If a post 6 ft. high casts a shadow 4 ft. long, how high must a pole be which casts a shadow 18 ft. long ?

9. The shadow of a church spire at 10 o'clock extends 30 ft. from the church. The shadow of a fence 4 ft. high, at the same time, is 1 ft. 6 in. How high is the church spire ?

10. A lot of land 4 rd. long, $24\frac{3}{4}$ ft. wide is inclosed by a tight board fence 5 ft. high. How much will it cost to build the fence at 5¢ a foot ? How much will the boards cost at the rate of $18 a thousand ? How much will it cost to paint the fence at the rate of 12¢ a square yard ?

11. How many cubic yards of earth must be removed in digging a cellar 16 ft. long, 12 ft. wide, $6\frac{1}{2}$ ft. deep ?

12. If granite weighs 2.78 times as much as water, and a cubic foot of water weighs 1000 oz., how many pounds, etc., will a block of granite weigh that contains $2\frac{2}{3}$ cu. ft. ? How much will a block weigh that is $8\frac{1}{2}$ ft. long and 8 in. square at the ends ?

13. If the area of the Sandwich Islands is 6400 sq. mi., and that of Hawaii is 4000 sq. mi., what part of the area of the entire group is the area of the other seven islands ?

1. John has 3 times as many cents as Mary, and James has 2 times as many cents as Mary. John has how many times as many cents as James?

2. If lead is $11\frac{3}{5}$ times as heavy as water, and iron is $7\frac{4}{5}$ times as heavy as water, how much heavier than iron is lead?

3. If gold is $19\frac{1}{2}$ and silver $10\frac{1}{2}$ times as heavy as water, how many times as heavy as silver is gold?

4. Gold is worth about $15\frac{1}{2}$ times as much as the same weight of silver. What would a piece of silver be worth of the weight of a twenty-dollar gold piece?

5. Mary and Julia bought together 2 pounds of candy, paying respectively 20 cents and 40 cents. How much candy ought each to have?

6. Two men buy a load of hay together, one paying $\$6\frac{1}{2}$ and the other $\$8\frac{1}{2}$. What part of the load ought each to have? If the load weighs 1.5 tons, how many pounds does each have? What is the price of the hay per ton?

7. A, B, and C own a farm together. B's share is twice as great as A's, and C's twice as great as B's. The farm is worth \$6000. What is each one's share worth?

8. If a cubic foot of anthracite coal weighs 96 lb., how many pounds can be put into a cart 6 ft. long, $4\frac{1}{2}$ ft. wide, and 2 ft. deep, without heaping?

9. How many flagstones, each 3 ft. long, $1\frac{1}{2}$ ft. wide, will be needed to lay a crossing 96 ft. long, 6 ft. wide?

10. How many bottles, each holding $\frac{3}{8}$ of a gill, can be filled from 18 gallons of ink?

11. A man has $13\frac{1}{2}$ A. of land. If he divides it into house-lots, each 200 ft. by 100 ft., how many lots will he have?

12. How many yards of cloth costing $12\frac{1}{2}¢$ per yard must be given in exchange for $16\frac{1}{4}$ bu. of onions at \$1.25 per bushel?

13. At the rate of $1\frac{1}{3}¢$ apiece, how many oranges can be bought for \$600? for \$6? for $\frac{5}{9}$ of a dollar?

14. How much will it cost to build 126.74 miles of railroad at \$1540.75 per rod?

1. If the interval between the flash and report of an explosion is $6\frac{1}{2}$ seconds, how far away is the explosion, reckoning the velocity of sound to be 1090 ft. a second?

2. If sound travels $3\frac{3}{4}$ times as fast through water as through air, how long would it take for an explosion one mile away to be heard under water?

3. Lightning was seen to strike a tree $3\frac{1}{2}$ seconds before the report of thunder was heard. How far away was the tree?

4. If $\frac{3}{4}$ of the weight of potatoes is water, and $\frac{5}{32}$ of their weight is starch, how many more pounds and ounces of water than starch are there in 100 lb. of potatoes?

5. In most parts of this country a bushel of potatoes weighs 60 lb. How many pounds and ounces of starch in 80 bu. of potatoes?

6. If a wheel 10 ft. in circumference turns round 1860 times in going from one place to another, what is the distance in feet? in miles?

7. The circumference of a circle is about $3\frac{1}{7}$ times the diameter. In going from A to B, 1430 revolutions of a wheel $4\frac{1}{3}$ ft. in diameter were counted. What is the distance?

8. How many times must a carriage wheel $3\frac{1}{2}$ ft. in diameter turn in going $2\frac{1}{2}$ miles?

9. If a man works $8\frac{1}{2}$ hours a day 6 days in a week, what fraction of the week is spent in work? If one-half of the remainder of his time is given to sleep, how many hours on an average does he sleep?

10. What fraction of August has passed at 10 A.M. August 16?

11. If \$2 will buy $\frac{4}{5}$ of a yard of broadcloth, how much will a yard cost? How much will \$8.25 buy?

12. How many cubic feet of earth must be removed in digging a cellar 18 ft. 3 in. long, 12 ft. 6 in. wide, and 5 ft. 9 in. deep?

13. At \$18.40 per M., what will the boards cost which were used in the floor of your school-room? (Draw plan.)

14. From a barrel of pork weighing 200 lb. there was sold 84 lb. 6 oz. What is the remainder worth at \$8.25 a hundredweight?

15. At \$5 a ton, what will 600 lb. of coal cost? 1500 lb.? 8 cwt.? 9 cwt. 20 lb.?

Measures of Length.

12 inches (in.)	=	1 foot (ft.)
3 feet	=	1 yard (yd.)
5½ yards *or* 16½ feet	=	1 rod (rd.)
320 rods	=	1 mile (mi.)

7.92 inches	=	1 link (li.)
100 links	=	1 chain (ch.)
80 chains	=	1 mile.

Measures of Surface.

144 square inches	=	1 square foot.
9 square feet	=	1 square yard.
30¼ square yards *or* 272¼ square feet	=	1 square rod.
160 square rods *or* 10 square chains	=	1 acre (A.)

Measures of Volume.

1728 cubic inches	=	1 cubic foot.
27 cubic feet	=	1 cubic yard.
16 cubic feet	=	1 cord foot (cd. ft.)
128 cubic feet *or* 8 cord feet	=	1 cord (cd.)

Measures of Time.

60 seconds (sec.)	=	1 minute (min.)
60 minutes	=	1 hour (h.)
24 hours	=	1 days (da.)
7 days	=	1 week (wk.)
52 weeks 1 day *or* 365 days	=	1 common year (yr.)
366 days	=	1 leap year.
12 months (mo.)	=	1 year.

Measures of Capacity.

Liquid Measure.

4 gills (gi.)	=	1 pint (pt.)
2 pints (pt.)	=	1 quart (qt.)
4 quarts	=	1 gallon (gal.), containing 231 cubic inches.

Dry Measure.

2 pints (pt.)	=	1 quart (qt.)
8 quarts	=	1 peck (pk.)
4 pecks	=	1 bushel (bu.), containing 2150.42 cubic inches.

Measures of Weight.

Avoirdupois Weight.

16 ounces (oz.)	=	1 pound (lb.)
100 pounds	=	1 hundredweight (cwt.)
20 hundredweight	=	1 Ton (T.)

Troy Weight.

12 ounces	=	1 pound.

Measures of Value.

10 mills (m.)	=	1 cent (¢ or ct.)
10 cents	=	1 dime (d.)
10 dimes	=	1 dollar ($).

---

12 pence (*d.*)	=	1 shilling (*s.*)
20 shillings	=	1 pound (£)

Miscellaneous Table.

12 things	=	1 dozen.
12 dozen	=	1 gross (gr.)
12 gross	=	1 great gross (G. gr.)
24 sheets	=	1 quire (qr.)
20 quires	=	1 ream (rm.)
10 reams	=	1 bale.

To avoid fine, this book should be returned on
or before the date last stamped below

50M—9-40

IX
511.1
P956
bk.

615016

Prince, John T.
Arithmetic by grades.

DATE NAME DATE
AUG 29 19

LIBRARY, SCHOOL OF EDUCATION, STANFORD

615016

DEPARTMENT OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

THE BEST TEXT-BOOKS

FOR COMMON SCHOOLS

FRYE'S GEOGRAPHIES

The most advanced views of teaching geography harmonized

WENTWORTH'S ARITHMETICS

Unsurpassed in arrangement method, and accuracy

PRINCE'S ARITHMETIC BY GRADES

Sound in method, satisfactory to teachers attractive to pupils

MONTGOMERY'S AMERICAN HISTORIES

The leading events of American history with their causes and their results distinctly and graphically shown

BLAISDELL'S PHYSIOLOGIES

True, scientific, practical, teachable

TARBELL'S LESSONS IN LANGUAGE

Language and grammar harmonized

STICKNEY'S READERS

A series of carefully-graded and thoroughly-tested reading books

GINN AND COMPANY'S WRITING BOOKS

A neat, legible hand acquired with ease and rapidly

THE EDUCATIONAL MUSIC COURSE

Pre-eminently a natural and rational course practical, systematic, progressive

GINN & COMPANY PUBLISHERS